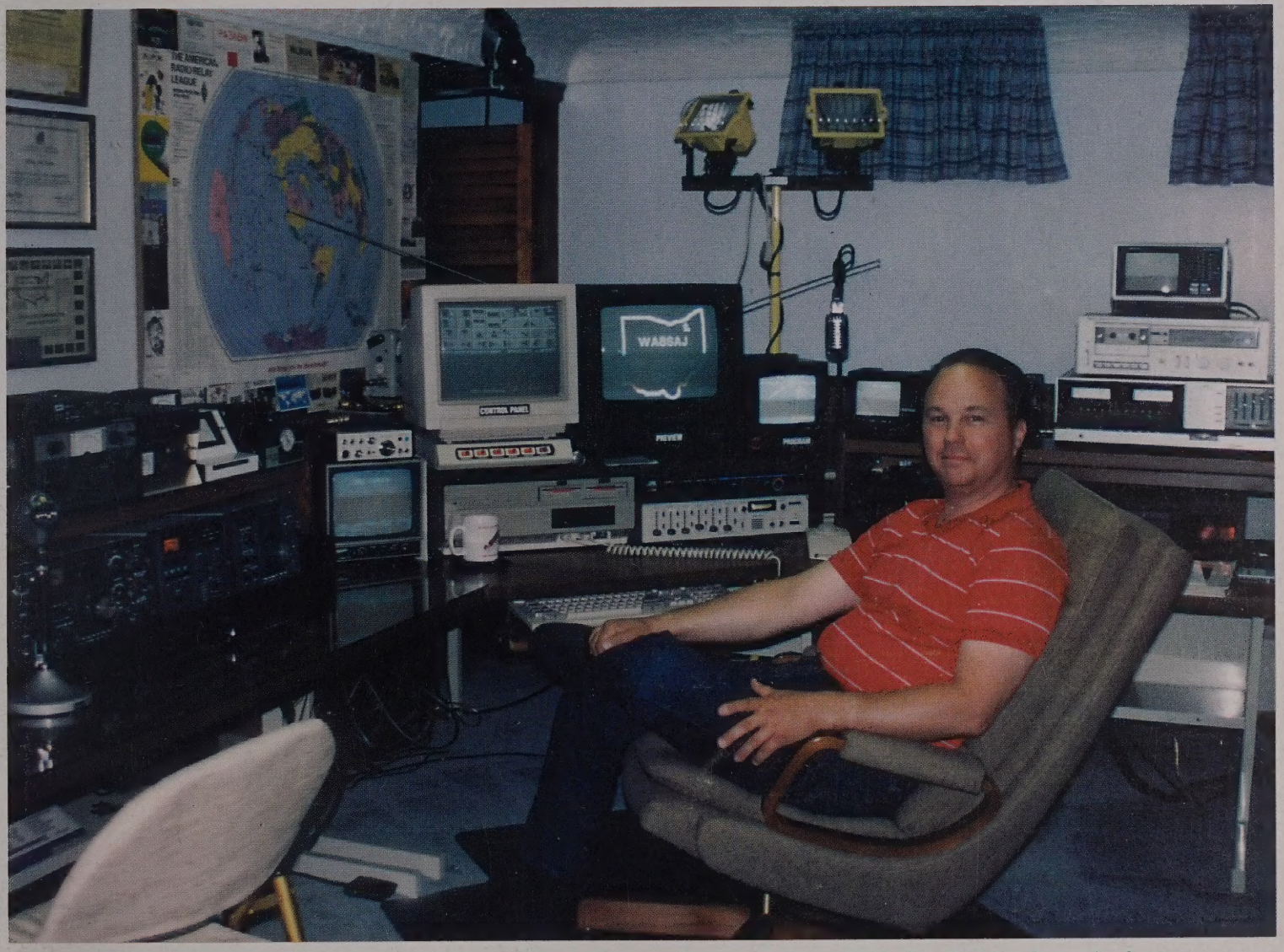
# AMATEUR TELEVISION QUARTERLY

$4.95

ISSN 1042-198X
USPS 003-353

VOLUME 7 #4
FALL 1994




*Jeff Covell WA8SAJ in Willoughby, Ohio relaxes in his ATV shack which includes Amiga Special Effects using the Toaster.* Photo by Bill WB8ELK

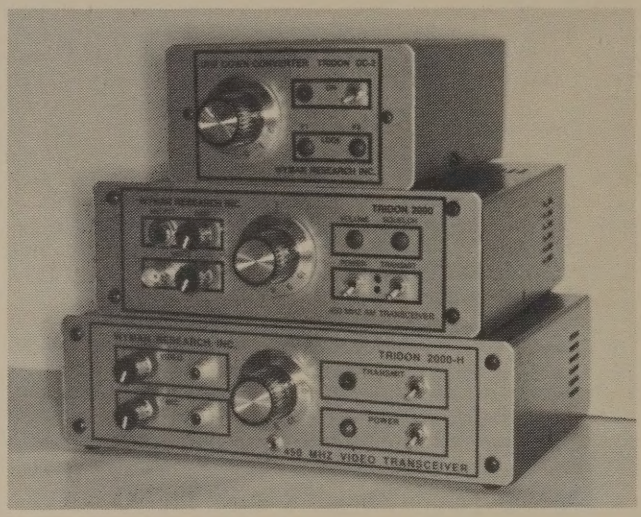
**BUILD: Preamps, Filters, ATV Repeater Controller, ATV Audio Squelch, TX/RX Sequencer, more...**

**ATV Activity and comming events.**

**New Q-TH for ATVQ!**

**WE MOVED!**

# TRIDON 2000 NOW HAS A BIG BROTHER THE TRIDON 2000H

| | | |
|---|---|---|
| DC-2 |  | $109.95 |
| TRIDON 2000 | | $329.95 |
| TRIDON 2000H | | $449.95 |

THE TRIDON 2000H HAS ALL THE FEATURES OF THE TRIDON 2000 WITH MORE FEATURES SUCH AS:

*15 WATTS PEAK POWER (ADJUSTABLE)

*LINE AND MIKE AUDIO INPUTS

*N TYPE ANTENNA CONNECTOR

*BUILT IN LINE SAMPLER

*BIG HEAT SINK

*CAMERA MONITOR OUTPUT

THE TRIDON 2000H RETAINS ALL OF THE ORIGINAL WYMAN RESEARCH FEATURES SUCH AS THE ON-CARRIER AUDIO SYSTEM AS WELL AS STANDARD SUB-CARRIER AUDIO SYSTEM

THE NEW WYMAN RESEARCH DC-2 HAS AN EXTREMELY SENSITIVE GaAsFET FRONT END AND IS HOUSED IN A NEW MATCHING TRIDON CABINET. THIS DOWNCONVERTER HAS AN OPTIONAL PROVISION FOR CRYSTAL LOCKING OF TWO FREQUENCIES FOR ACCURATE REPEATER AND SIMPLEX RECEPTION.

WYMAN RESEARCH INC HAS A FULL LINE OF 450, 900, 1200 MHz AM AND FM ATV TRANSMITTERS, TRANSCEIVERS, RECEIVERS AND AMPLIFIERS. ATV AMPLIFIERS FROM MIRAGE AND RF CONCEPTS ARE IN STOCK PRICED FOR QUICK SALE.

WYMAN RESEARCH INC. IS AGENT FOR ATV MAGAZINES SUCH AS:
ATVQ, BATC, VHF COMMUNICATIONS AND SPEC-COM.

WE ARE ALSO THE US AGENTS FOR THE WIDELY ADVERTISED SARAPARABOL E-600 FM-ATV RECEIVER BOARD SEEN IN SUCH MAGAZINES AS ATVQ. THE PRICE OF THESE BOARDS IS $199.95. THEY CAN BE USED FOR SUPERIOR FM-ATV RECEPTION FOR THE 900 AND 1200 MHz BANDS WITH LITTLE MODIFICATION.

WRITE OR CALL FOR A CATALOG DESCRIBING EQUIPMENT THAT WILL PUT YOU ON ATV AT MINIMUM COST. OUR TRANSMITERS AND TRANSCEIVERS ARE THE MOST POWERFUL AND ECONOMICAL SOLD.

## WYMAN RESEARCH INC.

Don & Sue Miller
W9NTP
W9YL

Don and Sue Miller
9145 S. 850 W.
Waldron, IN 46182-9608
(317) 525 6452

VISA MasterCard

INDIANA RESIDENTS 5% SALES TAX
SHIPPING $6.00

# AMATEUR TELEVISION QUARTERLY

VOLUME 7 #4 FALL 1994

**Amateur Television Quarterly, (ISSN 1042-198X) is published four times per year for $18 per year (USA) by Henry Ruh, 5317 W 133rd Ave, Crown Point, IN 46307 Second class postage paid at Crown Point, IN 46307 and additional mailing offices. POSTMASTER: Send change of address to ATVQ, 3 N. Court St., Crown Point, IN 46307**

Subscriptions and submissions should be sent to Amateur Television Quarterly (ATVQ) 3 N. Court St., Crown Point, IN 46307. Packages should be sent to : Amateur Television Quarterly, (ATVQ) 3 N. Court St., Crown Point, IN 46307. Telephone orders may be placed using Visa or Mastercharge call 219 662 6396 Leave a night or weekend number for any return calls. Orders may also be sent via fax at 219 662 6991. Unless otherwise requested, subscriptions begin with the current issue. Order forms for all ATVQ products are in the centerfold. Subscription rates: $18 USA, $22 Canada, $29 elsewhere per year. A subscription is four issues.



Amateur Television Quarterly is copyright 1994. All rights reserved. Non US publications may reprint portions provided credit is given in the title page and a copy of the publication is sent to ATVQ. Ham Clubs may obtain blanket authority to reprint ATVQ by submitting a written request with a copy of the club newsletter.



BACK ISSUES: are available exclusively from EFS Copy Service, 4011 Clearview Dr., Cedar Falls, IA 50613. 319 266 7040. A cumulative index was published in Volume 7 #1.
Publisher: Henry B. Ruh KB9FO
Cartoons: Robert Beasley K6BJH
Translations: Andrew Emmerson G8PTH
Re-draft of drawings by Bill Parker W8DMR
Typist, Debra Gillespie


# Index


5 *NEW Q-TH,*
5 *Repeater news, CA, AR, Parts 4 sale*
6 *Want Ads and News and Hamfests*
12 *W6ORGy Notes*
16 *July Fireworks with Gordon West WB6NOA*
17 *ATV Covers Old Settlers Parade, Doug KA9HDZ*
18 Fiesta Days *ATV, Mary AB6VI*
19 *Using the Titlemaker for ATV and other creativity, KR0L, AB6VI*
20 *CAATN Notes, LISATS Activity*
24 *Ft. Wayne Hamfest and Computer Expo, Don WB8HQS*
25 *Houston ATV news and events, HATS*
27 *ATV Country Style, Bill W4BEJ*
28 BUILD*: ATV Audio Squelch, Brian KF0WD*
31 *ATVQ Catalog and Subscription forms*
35 BUILD*: TX/RX Sequencer*
38 *So You Want to Build an ATV Repeater. Part 3, Mike WA6SVT*
41 *New Digital Satellite Systems*
42 *BRATS VS-100 ATV Controller Interface, Mike N3EZD*
45 *FCC News, Baloon ATV, Old Thrasher's Reunion ATV*
46 BUILD: *23 cm Preamplifier, CQ-TV*
48 BUILD: *1250 MHz Filter, Art WA8RMC*
49 *SWIECH ANTENNA, Review by Mike WA6SVT*
51 *Weather Radar, More HI-CA, Humor: In Bad Taste!*
52 BUILD: *A VIDEO DA, KB0GL*
53 *Beginners Corner, Tom, W6ORG*
54 *ATCO Repeater and Operations news*
57 *Rochester ATV and Rabbits for ATV*
58 *Beginners Corner, Basic station, Henry KB9FO*
60 ATVQ on America OnLine, The Grape Vine!!
62 *Words of Warning, Humor from Andy G8PTH*

*Tidbits throughout our 68 pages!*


## NEW AT Q
## WE MOVED!

We have moved from a half acre antenna farm to a five acre antenna farm. Well, with 11 dogs and 4 cats we had to have more room somewhere!

This issue is being put together in the middle of selling/buying houses, moving and regular work. So far we have filled a 10 x 20 garage storage place and the house still looks full.

The new address for ATVQ is 3 North Court Street, Crown Point, Indiana, 46307. This will be the new mail/package delivery point for the magazine. The new phones are: Voice 219 662 6396, FAX 219 662 6991. All should be working by the time this is in your hands.

Where's Bill WB8ELK? Bill has been working 16 hour days at the Redstone missle plant in Alabama. Says he hasn't had much time for ATV since leaving 73 magazine.

73 Henry KB9FO.

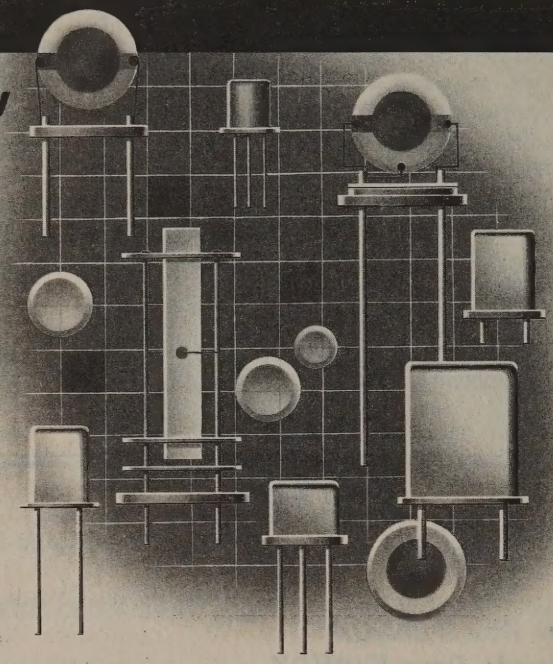
# CUSTOM CRYSTALS

## Crystals for many applications

For over 40 years, ICM has manufactured the finest in quartz crystals for every conceivable purpose.

A wide selection of holders are available to fit most any requirement. Our computer database contains crystal parameters for thousands of equipment types.

Need crystals for communications, telemetry, industrial, or scientific applications? Let ICM's sales department assist you to determine which type of crystal is best for you.



## Can we solve your crystal problem?

For special purpose crystals, special holders, special sizes, call our crystal sales department. We will be pleased to provide recommended data.

ICM

**International Crystal Manufacturing Co., Inc.**

P.O. Box 26330, 701 W. Sheridan,
Oklahoma City, OK 73126-0330
Phone (405) 236-3741
Telex 747-147
Facsimile (405) 235-1904

*Designed specifically for amateur television in the 70cm band...*

# FL407 INTERDIGITAL FILTER

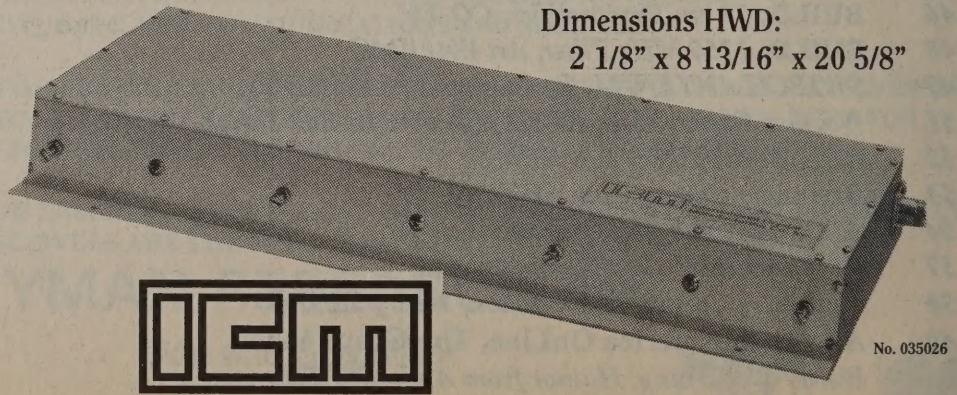
**7-Pole Interdigital Vestigial Sideband Filter for Frequency Ranges of 420 MHz to 440 MHz**

**Ordering Information:** The FL407 may be ordered on any frequency between 420 and 440 MHz. Please specify video carrier frequency when ordering.

Dimensions HWD:
2 1/8" x 8 13/16" x 20 5/8"

The 6 MHz nominal bandwidth and low loss design are perfect for transmitter or receiver use. Two filters can be used for repeater applications.

Heavy duty construction insures stable operation and long life.



No. 035026

ICM

**International Crystal Manufacturing Co., Inc.**

P.O. BOX 26330 • 701 W. SHERIDAN • OKLAHOMA CITY, OK 73126-0330 • (405) 236-3741 • FAX (405) 235-1904

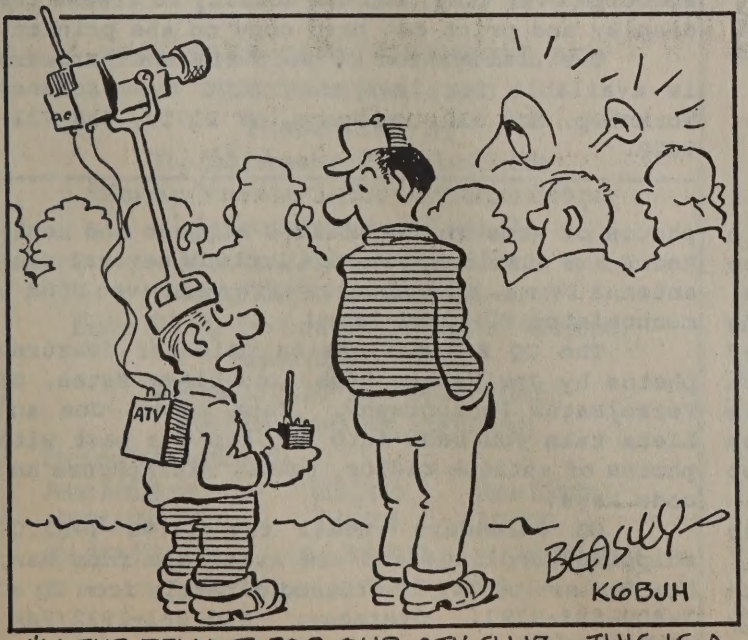
# *we've moved!*

After 8 years we have out grown the half acre antenna ranch. Effective Nov 5th, we will have moved to our new antenna farm in Indiana. As a result ATVQ has a new address and new phone numbers. As this is being written, we are in the middle of the real estate transactions and moving. Mail addressed to the old Des Plaines address will be forwarded for one year. The new mail and package address is 3 N. Court St., Crown Point, IN 46307. The new phones will be VOICE 219 662 6396, Fax 219 662 6991. For fastest response you can send us E-Mail on America On-Line. Just E-Mail to ATVQ. Bear with us, it will be a little slow untill we get fully unpacked.So far I have stored 14 van loads of stuff, and the house still looks full.

Meanwhile, we will need your material for the next issue as soon as possible. If you have been putting off that article on your local repeater, that new construction project, or local operating news, NOW is the time to send it in. We are always looking for good cover photos. Examples are on the front of every issue! A nice color photo, regular size or larger if you can. Be sure to describe the contents of the photo, names, calls, and the activity involved. ATV'ers doing something are more exciting than still life!

## MORE FUN NEEDED

Hey, lets put some fun back into the hobby. Tom W9NBG's contest and certificate ideas have not had as big a response as expected. Either we are all too busy, or we are not contest oriented. Send in your ideas now! If it works with the Certificate program all the better. Get on the air and be seen! Generate some interesting programs with your camcorder, even a good station ID.




I'M THE REMOTE FOR OUR ATV CLUB--THIS IS A CONTINGENCY CAMERA MOUNT IN CASE I ARRIVE AT THE PARADE A LITTLE LATE

# VALLEYVISION LINKING

## Pat Fennacy, W6YEP

Two high-level amateur television repeater sites in the San Joaquin Valley (central Calif.) are installing a full duplex FM video link for the ValleyVision network. The 70 mile path will tie WB7UGZ and W6YEP ATV units together offering united coverage from Stockton to Bakersfield, · Both repeaters are horizontally polarized and utilize 1.2 GHz inputs. The UGZ/Merced system (427.25 MHz) and the YEP/Fresno system (421.25 MHz) run 35 watts TPO. High Frequency Technology of Cary, Illinois, W6YEP, said, "HF Technology FM equipment is a great improvement for ATV applications. It really stole the show at Dayton '93." Once wired into the VideoTek distribution amplifiers and digitally controlled routing switchers, the network link should be operational in November.

# ARKANSAS ATV REPEATER

**Dale Holland, N5RAC**

The K5DAK Pine Bluff/Jefferson County ATV repeater has been on the air since August 8, 1994. Equipment lineup is as follows: AEA VSB70 exiter Mirage D100ATV-R amplifier RXTX Duplexer AS70 Slot Ant. At about 175 ft. Stacked Alford Slot on 1255 MHz. Micro Computer Concepts VS100 controller HF Technology downconverter and IF on 1255 MHz FM.. Output is on 426.25 at about 60 watts with inputs on 439.25 AM and 1255 MHz FM.

**I also have the following items for sale:**

1 - ICM VSB Filter 626.25
1 - ICM VSB Filter 439.25
1 - RTX-70 repeater transmitter 426.25

All are in like new condition. I am asking $700.00 for all or will sell separately.

# WANTED:

4 pin triode tubes, audio power output tubes, Western Electric tubes, big old loud speakers, tube hifi amps, audio transformers. Call Vernon Vogt, 206-382-5571 or write 330 SW 43rd St., #247, Renton, WA 98055.

---

Thank you very much for the special mailing of the Winter, 1994 and Summer, 1994 issues of ATVQ magazine and the very impressive ATVQ Society Certificate.

Although I am not a wallpaper collector, the certificate will be displayed with other Hamfest badges that are decorating my ham shack.

Recently, I ordered some copies of back issue information to help me get started in ATV. I presently live in a low tech area, (doctor, lawyer and Indian chiefs) about 70 miles from the nearest ATV enthusiast. I am attempting to bring ATV to this area, especially the newcomers who will be the ham population of tomorrow.

Presently, I am constructing, using PC Electronic boards, a mast mounted simplex system, two feet of antenna feed line and 100 feet of video/power lead. With a little pre-emphasis on the video line, I hope to overcome that lossy piece of antenna coax from the transmitter to the antenna. With any reasonable luck, I will forward to you some *Briefly Speaking* ATV topics.

Again, thank you for your consideration.
W. Max Adams, W5PFG

---

# CQ ANNOUNCES 1995-96 HAM RADIO CALENDARS

(Hicksville, NY) -- CQ's popular ham radio calendars are back just in time to order for the new year! The 1995-96 editions cover 15 months, from January, 1995, to March, 1996, and include major holidays, ham radio contests and conventions, plus astronomical information such as phases of the moon, lunar apogee and perigee dates and major meteor showers. The calendars feature all new photographs from top professional photographers.

Two versions of the CQ 1995-96 calendar are available:

The CQ Amateur Radio Calendar, with photographs by CQ staff photographer Larry Mulvehill, WB2ZPI, features brilliant color photos of some of the world's biggest and best-knows ham stations. Photos include several real antenna farms, a moonbounce array and even N6DX's mountaintop 80-meter beam!

The CQ Radio Classics Calendar features photos by Joe Veras, N4QB, and Liesa Bates, of Veras/Bates Photography. Each month, Joe and Liesa take you back into ham radio's past with photos of antique radios, tubes, microphones and code keys.

CQ calendars retail for $9.95 (+$2.00 shipping/handling) and are available from many ham dealers or may be ordered directly from CQ at 1-800-853-9797. Overseas: 516-681-2922/Fax: 516-681-2926.

# WANTED:

Four TV lenses to complete restoration of early postwar RCA camera. Lenses look similar to C-mount but are larger, with approximately 2 3/16ths inch fine thread mount. Also needed: C-mount Balowstar and Reflectar lenses. Good money paid. Contact: Andy Emmerson G8PTH, C/O Henry at ATVQ. Thanks.

---

# NEW SOFTWARE CONVERTS COMPUTER INTO RF SPECTRUM ANALYZER

(Bethpage, NY, June 28, 1994) Science Workshop and Pioneer Hill Software introduced their RF Vision software, which makes it possible to display the RF spectrum on any IBM compatible PC. The mass production of stereo sound cards for computers provided the key to A/D and D/A conversion and data processing at extremely low prices. Comparable industrial circuitry could cost thousands of dollars.

Using Science Workshop's Poor Man's Spectrum Analyzer kit as the source of the two audio signals processed by the sound card, the RF Vision software, running under Windows 3.1, displays the RF spectrum on the computer screen in real-time. The program also incudes a 3D Surface Plot, a Color Spectrogram of the RF spectrum over time, and the ability to freeze the display and print out hard copy on the printer.

The combination of software and hardware is available for less than $200 from Science Workshop, Box 310, Bethpage, NY 11714, 516-731-7628.

---

# ATV SIGNAL TRAVELS 225 MILES

**Bill Parker, W8DMR**

Dick,W8RVH, in New Carlisle, Ohio, northeast of Dayton, was transmitting on 1280 MHz using FM ATV modulation. His signal was received by W9NTP in Waldron, Indiana, south of Indianapolis. Don, W9NTP, simultaneously retransmitted Dick's video on 439.25 MHz so Dick could see how well he was being received..

Bill, W8DMR, in Columbus, Ohio could not see W8RVH on 1280 MHz or W9NTP on 439.25 MHz, but the Dayton ATV repeater on 426.25 MHz was repeating W9NTP's ATV signal. It was P3 in Columbus, Ohio. Much to my surprise, I could see W8RVH's test pattern.

W8RVH's signal traveled 75 miles to W9NTP and then it was returned another 75 miles to the Dayton ATV repeater, W8BI. From Dayton, it was sent another 75 miles to Columbus, Ohio. In spanning the approximately 225 mile path, three transmitters, three receivers and three different frequencies were employed.; both FM and AM video modulation techniques were also used.

Dick and Don were not aware that I was monitoring the DARA ATV repeater. There is more than one way to get a bang out of the 4th of July without setting off explosives at 7:50 AM EST.

**1994 LAKE COUNTY HAMFEST AND ELECTRONICS EXPO**
**Presented by**
**The Lake Amateur Radio Association**
**Saturday, November 5, 1994 - 9:00 am to 5:00 pm**
Lake County Fairground - Eustis, FL
More than 125 Indoor Swap Tables
Lots of Outdoor Tailgate Locations
Exams (W5YI) - Novice thru Extra (Walk-ins welcomed)
Exams start at 11:30 am
Awesome ATV and Packet Demonstrations!
Door Prizes, Snack Bar, Free Parking
For more information call:

| Jason Matthews | Bill Davis | Steve Eshom |
|---|---|---|
| KE4AUS | K4UYN | AC4KN |
| 904-357-9357 | 904-787-4283 | 904-343-5414 |

Talk in Frequency 147.255 or 422.900

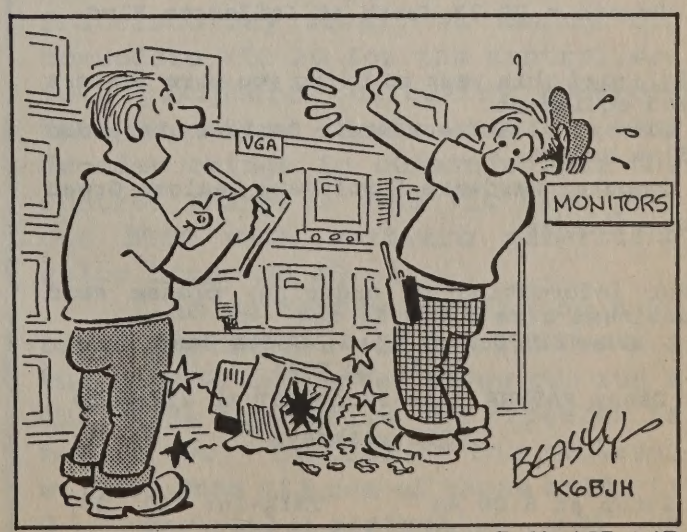
# NEW DIRECTION FOR THE RADIO AMATEUR CALLBOOK

Radio Amateur Callbook announces Ted Misa as the publisher and General Manager for this broad line of products; including Gordon West Radio School tapes and books, Bill Orr books, and the North American and International editions of the popular Radio Amateur Callbook Directories.

The Radio Amateur Callbook line of products fits in well with our New Jersey Distribution Facility. We will be aggressively re-establishing our dealer network, upgrading our communications with Ham Clubs and to amateur radio operators who call in, and will continue to stay on schedule with the new 1995 Callbooks that will be published this December, comments Ted Misa.

Gordon West (WB6NOA) comments, I will be working closely with the Radio Amateur Callbook to revitalize our dealer network, and will continue to offer ham operators the latest in training materials at both the dealer level and instructor level.

The new 1994-95 Radio Amateur Callbook catalogue will soon be available. For more information about the Radio Amateur Callbooks and other ancillary products, please contact your local dealer, or R.A.C. at 908-905-2961, located at 1695 Oak Street, Lakewood, New Jersey 08701.

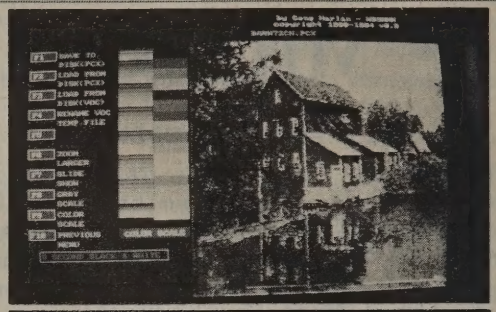


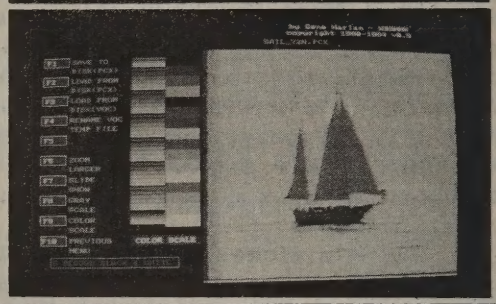
IS THIS CASH OR WOULD YOU LIKE TO USE OUR REVOLVING CREDIT PLAN?

# NEW!! COLOR SLOW SCAN TV for the Sound Blaster!

VISA MasterCard

**Now, *send* and *receive* Slow Scan TV with your Sound Blaster Compatible card in FULL COLOR!!** **ONLY $99.95**





**SLOW SCAN II**
**Copy 8,12,24,36 sec. B&W, 36 & 72 sec. Color (in B&W), Scotty 1 & 2 (in B&W). $40.00**

**AUDIO ANALYZER**
**Analyze audio signals such as SSTV, RTTY, Amtor, and Packet radio. Copy live or from a .VOC file. ONLY $39.95**

Requires PC, VGA 640x480-256 colors, and Sound Blaster compatible card.

Shipping $5 - Overseas $10
Illinois residents add 6.25% tax

**Harlan Technologies**
**5931 Alma Dr. - Rockford, Illinois 61108**
**815-398-2683**


## 18th Annual SOUTH BEND HAMFEST AND COMPUTER EXPO

Sunday, January 8, 1995 - 8:00 am - 3:00 pm
Century Center Convention Hall
Downtown US 33 North at Jefferson Blvd.

*Enlarged* this year to bring you more dealers and equipment.
Commercial Amateur Radio Dealers Expanded Flea Market
Computer Hardware & Software Dealers Great Door Prizes

For information or ordering, please send business size S.A.S.E. to:
MVHA-21970 Kern Road, South Bend, IN 46614 or call
Denny KA9WNR 7 pm-10 pm EST at 219-291-0252 weekdays

Setup at 6:00 am Talk-In: 52, 39, 09, 145.29
Sponsored by Michiana Valley Hamfest Association

## WEST TEXAS AMATEUR RADIO CLUB 11TH ANNUAL HAMFEST

**Robert Jordon, N5RKN**

I represent the West Texas Amateur Radio Club in Odessa, Texas. We are currently planning our 11th Annual Hamfest Convention on November 5th and 6th. I am contacting your company hoping you will consider sending brochures on your products. We have had great interest in the brochures in the past. This year, we will be sending out over 4,000 registration flyers.

The Hamfest Convention is at the Holiday Inn Convention Centre in Odessa. We have expanded to near 20,000 sq. ft. with over a 200 tables setup last year. We are one of the last Hamfests of the year for the Southwest and for that reason, we get a good crowd for the event. As the event nears it's 11th year, our attendance has grown steadily.

*New!*

## 70 CM - 4 Frequency Transmitter & P.A. for ATV use

### DRIVE THIS SPECIAL POWER AMPLIFIER WITH A 4 CHANNEL CABLE CONVERTER

CH 57 - 58 - 59 - 60

421.25 427.25 433.25 439.25 Mhz.

PD-440NA - Power amp 1 mw=6W output P.E.P.
Size 3½" x 5" with full heat sink, color: blue or black enclosure ..... $179.00
CATV driver Transmitter (4) channel frequency with power supply ..... 140.00
Matching down converter black or blue ..... 88.00
If you have a cable ready TV set use with a preamp rather than investing in a down converter for receive.
The PD-440NA can drive a PD-440N-2R or a PD-440N-3 to a power level of 55W P.E.P.
PD-440NA can be custom built for T/R switching. Call for price quote.

## POWER AMPLIFIERS

All of our P.A. have rugged diecast enclosures and full heat sinks. Some are custom built. We sell both features, with or without T/R. We usually request info on duty cycle and drive power requirements. We supply charts and data sheets on each of our units so that specs. may be determined. The charts contain honest information as to the performance of each unit. Power Amps that are rated at 100 watts output will not give the full output on ATV. Poor pix quality plus sync clipping results.
A max ATV output would be no better than 45 watts with an average output between 30 and 40 watts of power with good video response.

WARRANTY: 2 YEARS ON LABOR
1 YEAR ON PARTS
6 MONTHS on the power module unless the module has been destroyed by an over-drive condition.

SHOULD THE PRODUCT THAT YOU ORDERED BE OUT OF STOCK THE MAX TIME FOR THE SHIPMENT WOULD BE 10 DAYS.

**pauldon** ASSOCIATES

210 Utica Street Tonawanda, NY 14150 (716) 692-5451

POWER AMPLIFIERS

All of our Power Amplifiers are diecast and rugged heavy duty type. We can custom build the P.A. without T/R switching, if desired. Because the Power Amplifiers have a switchable input the power output is maximum. The amps are broad banded (4½"x 7½") with full size H/S.

2 MTR (144-148 mhz.). Exciter ½-5W=35W FM switched input.
PD-144N T/R RF sensed..... $ 119.00
WITH PREAMPLIFIER..... 149.00

2 MTR (144-148 mhz.). Exciter ½-5W=60W FM, switchable input.
PD-144N-2 T/R RF sensed..... 159.00
WITH PREAMPLIFIER..... 189.00

2 MTR (144-148 mhz.). Exciter ½-5W=40W Linear & FM. Input switched.
PD-144N-1 T/R RF sensed..... 149.00
WITH PREAMPLIFIER..... 179.00

1¼ MTR (220 mhz.). Exciter ½-5W=35W FM, switched input.
PD-220N RF sensed T/R..... 129.00

70 CM (420-450 mhz.). Exciter ½-5W=18W Linear or FM, switched input.
PD-440N T/R RF sensed..... 129.00
WITH PREAMPLIFIER..... 159.00

70 CM (420-450 mhz.). Exciter ½-5W=35W Linear or FM switched input.
PD-440N-1 T/R RF sensing..... 153.00
WITH PREAMPLIFIER..... 189.00

70 CM (420-450 mhz.). ½W=55W Linear or FM.
PD-440N-2 T/R RF sensed..... $305.00

70 CM (420-440 mhz.). 3½W=55W Linear or FM.
PD-440N-3 T/R RF sensed..... 265.00

70 CM (420-450 mhz.). 3½W=60W Linear or FM.
PD-440N-2R NO T/R..... 225.00

| | | |
|---|---|---|
| 23 CM (1.2 ghz.) | 1W=18W | PD-1200N.....169.00 |
| 23 CM (1.2 ghz.) | 1W=22W, 2W=36W | PD-1200N-1.....296.00 |
| 23 CM (1.2 ghz.) | 10mw=18W | PD-1200N-5.....275.00 |
| 33 CM (900 mhz.) AM | 1-5mw=8-10W | PD-33VLP-1.....125.00 |
| 33 CM (900 mhz.) FM | 1mw=1.5-2.0W | PD-33VLP-2.....119.00 |
| 33 CM (900 mhz.) Lin. | 1W=18W | PD-33LHP.....265.00 |
| 33 CM (900 mhz.) Lin. | ½W=6W | PD-33LP.....135.00 |
| 33 CM (900 mhz.) Lin. | 6W=18W | PD-33HP.....139.00 |
| 33 CM (900 mhz.) FM | 1W=20W | PD-900N-1.....129.00 |
| 33 CM (900 mhz.) FM | 180mw or 1W=10W | PD-900N.....65.00 |

*Many others to choose from, some T/R.*

2.0 Mhz. to 30 Mhz. H.F. Power Amplifiers broad banded types. MWT Slam Devices used (solid state linear amp. modules). Call for information.

# CENTRAL ILLINOIS/ST. LOUIS AREA AMATEUR TELEVISION CLUB

**Scott C. Millick, K9SM**

The Eighth Annual Central Illinois/St. Louis Area Amateur Television Banquet will be held on November 26, 1994, at the Ariston Restaurant in Litchfield, Illinois. Last years' attendance was almost 80, and with the continued growth of amateur radio and the increased interest in amateur television, we hope to have even greater participation this year.

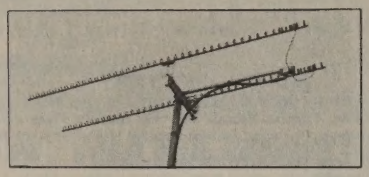
# NEED REPEATER CONTROLLER

**Steve Muther, WF6R**

Here on the Black Mountain ATV repeater (covering the south San Francisco Bay area), we use an old commodore VIC 20 for the controller. Some peripheral circuitry monitors the repeater inputs and a DTMF decoder brings in commands from the control channel. The vic also puts out NTSC with software generating color bars and ID.

I am currently working on a PC based controller which will have a VGA to NTSC converter so we can run a GIF slide show while the repeater is not in use. Control of the repeater will be done via one of those multi I/O industrial controller add on boards.

## DOWN EAST MICROWAVE



**MICROWAVE ANTENNAS AND EQUIPMENT**
• Loop Yagis • Power Dividers •
Complete Arrays • GaAs FET Preamps
• TROPO •EME • Weak Signal • OSCAR •
Microwave Transverters
902 1269 1296 1691 2304 3456 MHz

2345 LYK45el 1296 MHz 20 dBi $89
1345 LYK45el 2304 MHz 20dBi $75
3333 LYK33el 902 MHz 18.5dBi $89
Above antennas kits available assembled.
Add $8 UPS s/h
Add $11 UPS s/h West of the Mississippi.

**MICROWAVE LINEAR AMPLIFIERS SSB, ATV, REPEATER, OSCAR**

2316 PA 1w in 18w out 1240-1300 MHz $265
2335 PA 10 in 35w out 1240-1300 MHz $315
3318 PA 1w in 20w out 900-930 MHz $265
3335 PA 10 in 40w out 900-930 MHz $320
23LNA preamp 0.7dB N.F. 1296 MHz $ 90
33LNA preamp 0.9dB N.F. 902 MHz $ 90

**NEW PRODUCT ANNOUNCEMENTS**

**New Loop Yagis**
1845 LY Loop Yagi 1691 MHz 20dBi $99
945 LY Loop Yagi 3456 MHz 20dBi $89
Above antennas assembled and tested

**New Preamps**

13LNA 0.7dB N.F. 12 dB 2.3 GHz $140
18LNA20 0.8dB N.F. 20 dB 1.69 GHz $140
SLNA 1.0dB N.F. 10 dB 2-2.7 GHz $150

**New Wideband Power Amplifiers**

2370 PA 3w in 70w out 1240-1300 MHz $695
2340 PA 2w in 35w out 1240-1300 MHz $355
2318 PAM 1w in 18w out 1240-1300 MHz $205
Rack mount Amplifiers for repeater use available.

**NO TUNE MICROWAVE LINEAR TRANSVERTERS**

From SHF SYSTEMS a new line of transverters designed by
Rick Campbell KK7B and Jim Davey WA8NLC

Available in kit form or assembled/tested

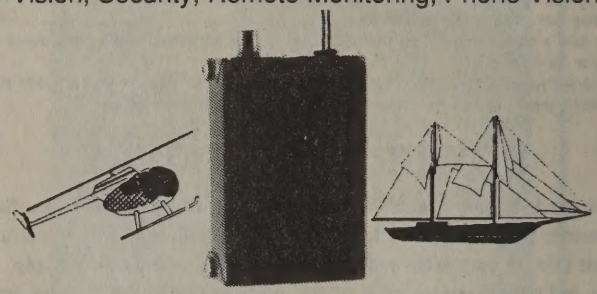
- 903 1269 1296 2304 3456 MHz
- microstrip filters eliminate tune-up
- 2m i-f, PIN diode switched
- sequencer standard in complete unit
- low profile packaging, mast mountable

**All active equipment - 13.8V**

DOWN EAST MICROWAVE
BILL OLSON, W3HQT
Box 2310, RR-1 Troy, ME 04987
(207) 948-3741

## Micro-Video Camera
SMALL SIZE 2"x3"x1"

Feather Weight 4 oz.
NTSC Output 240 TV Lines
Low Light 2 Lux 7-15 VDC/<100ma.
Typical Applications: ATV, Robotics, Computer Vision, Security, Remote Monitoring, Phone Vision

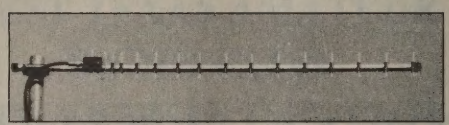


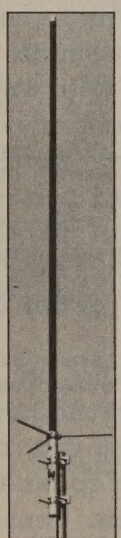
## Factory New $229.95
Add $5.00 S/H Ca. add 6.75%

## Micro Video Products
1334 So. Shawnee Dr. • Santa Ana, CA 92704
1-800-473-0538 (714) 957-9268

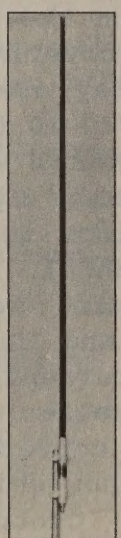
## COMET
ANTENNAS FOR THE PROFESSIONAL AMATEUR

**CYA-1216E**
16 Element Yagi Beam 1260-1300MHz
Gain: 16.6dBi
VSWR: 1.5:1 or less
Impedance: 50 ohms
Max. Power: 100 watts
Polarization: Vertical or Horizontal
Length: 4' 5"
Weight: 7 lbs. 11 ozs.
Mounting Mast Diameter: 1"-2½"
Connector: N-Type
Construction: All Aluminum



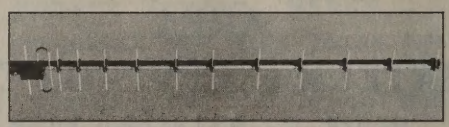


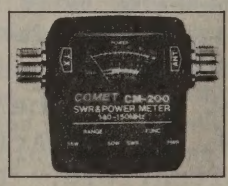
**CA-1243Z**
Dual Band
440-450MHz
1250-1300MHz
Base/Repeater Antenna
5/8 Wave x 4 446MHz
5/8 Wave x 9 1200MHz
Gain: 446 9.4dB, 1200 12.8dB
Impedance: 50 ohms
VSWR: 1.5:1 or less
Max. Power: 446 150 watts, 1200 50 watts
Length: 7' 5"
Weight: 2 lbs. 8 ozs.
Connector: N-Type
Construction: Heavy Duty Fiberglass



**CA-1221S**
Mono Band
1260-1300MHz
Base/Repeater Antenna
1/2 Wave 21 Step Collinear
Gain: 15.5dB
Impedance: 50 ohms
VSWR: 1.5:1 or less
Max. Power: 100 watts
Length: 8' 6"
Weight: 2 lbs. 3 ozs.
Mounting Mast Diameter: 1¼-2½ inches
Connector: N-Type

**PYA-913**
Base 13 Element Yagi
904-920 MHz
Gain: 15.8dBi F/B ratio over 20dB
Max. Power: 150 watts
VSWR: 1.5:1 or less
Length: 4' 8"
Connector: N-Type
Construction: Aluminum





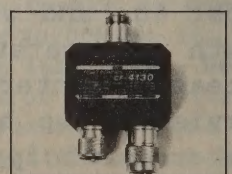

**MINI SWR Power Meters**

| | | Max. Power | Insertion Loss |
|---|---|---|---|
| CM-200 | 140-150MHz | 45 watts | 0.1dB |
| CM-300 | 200-240MHz | 60 watts | 0.2dB |
| CM-400 | 420-460MHz | 50 watts | 0.2dB |
| CM-420 | 140-460MHz | 50 watts | 0.1-0.2dB |
| CM-900 | 840-950MHz | 60 watts | 0.2dB |
| CM-1200 | 1225-1325MHz | 60 watts | 0.25dB |

Measurements: 2.25"w x 2.25"h x 1.1"d
Weight: 5.25 oz.
CM-200, 300 and 400 have SO 239 Connectors
CM-420, 900 & 1200 have N Connectors

**FP-19**
Base/Repeater
905-925MHz
Gain: 16dBi
Impedance: 50 ohms
VSWR: 1.2:1 or less
Max. Power: 100 watts
Length: 7' 4"
Connector: N-Type
Construction: Heavy Duty Fiberglass

**CF-4130** 446/1200MHz
dB Loss: 1.3-460MHz 0.2dB, 900-1400MHz 0.3dB
Band Rejection: 55dB Down
Max. Power: 146MHz 800W PEP, 446MHz 500W PEP, 1200MHz 200W PEP
Connectors: N-Type



NCG CO. 1275 North Grove Street • Anaheim, CA 92806 • (714) 630-4541 • Orders (800) 962-2611

**CALL FOR THE DEALER NEAREST YOU!**

ATV
ELECTRONICS
16807 N. 46TH LANE
GLENDALE, AZ. 85306
PHONE: (602) 843-3585

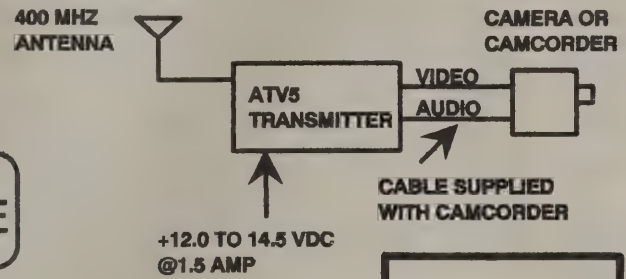
# ATV ELECTRONICS

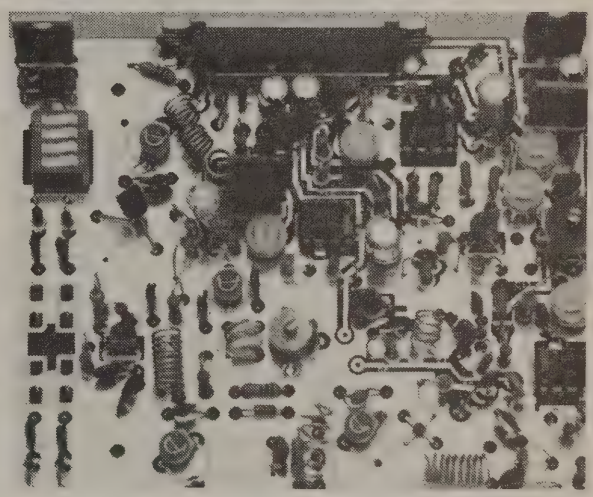
## THE ATV5 400MHZ ATV TRANSMITTER FEATURES !

- O UP TO 4 CRYSTAL FREQUENCIES !
- O USE WITH 12 TO 14 VDC !
- O 300 VOLT/uSEC VIDEO !
- O ADJUSTABLE SYNC STRETCHER!
- O POWER MODULE ON THE BOARD !
- O LINEAR MODULATION WITH OP AMP!
- O ONLY 5 TUNING CAPS FOR 400 MHZ !
- O INCLUDES AUDIO SUBCARRIER GENERATOR !
- O PHASE LOCK LOOP FOR 4.5 MHZ AVAILABLE !
- O 10 WATTS !
- O TEMPERATURE COMPENSATED 4.5 MHZ !
- O DRIVES 50W M67728 BRICK !

THIS IS THE MORE POWERFUL TRANSMITTER THAT RIVALS THE COMPETITION. IT HAS SUCCESSFULLY BEEN USED IN REPEATERS AND ATV TELEVISION STATIONS ACROSS THE COUNTRY. IT IS AN ALL IN ONE BOARD WITH SOUND FOR THE AMATEUR THAT WANTS TO PACKAGE AND MAKE HIS OWN FIXED OR PORTABLE ATV TRANSMITTER. THIS BOARD IS WIRED AND TESTED PRIOR TO DELIVERY. THE ATV5 PROVIDES AT LEAST 6 Db (ONE P UNIT) MORE POWER THAN THE ONE WATTERS. NO NEED FOR A POWER AMPLIFIER SINCE IT IS ALREADY ON THE BOARD. SAVES HUNDREDS OF $. ORDER THE ATVPLL4.5 AND HAVE CRYSTAL CONTROLLED 4.5 MHZ SUBCARRIER AUDIO (NEW PRODUCT).

EASY TO USE. JUST MOUNT IN A BOX. CONNECT AN ANTENNA, +12 TO +13.8 VDC, CAMCORDER CABLE VIDEO AND AUDIO, AND YOUR ON TV WITH PICTURE AND SOUND.



ATV5 - $229.00
PLL4.5 - $49.00

CALLS ACCEPTED AFTER 6PM PHOENIX TIME. SPECIFY FREQ'S 426.25,427.25,434.00, AND 439.00. ONE FREQ INCLUDED. EXTRA FREQ/S $16.00 EACH. INCLUDE $5.50 FOR SHIPPING AND HANDLING. AZ RESIDENTS ADD 6.7% SALES TAX. CHECK OR MONEY ORDER.

ESF COPY SERVICE

RALPH WILSON WB0ESF

BACK ISSUES OF YOUR

FAVORITE MAGAZINES

ATVQ AMATEUR TELEVISION

QUARTERLY

RTTY JOURNAL A5/SPEC-COM

SEND FOR PRICE LIST

4011 CLEARVIEW DR

CEDAR FALLS, IA 50613

319 266 7040

# THE W6ORGy NOTES

Tom O'Hara, W6ORG

## ATV DX RECORD

2509.4 miles blows the previous record by many hundreds of miles. I couldn't find anything on the previous records in the old magazines, but I remember there were some very long DX over 1000 miles between states in the Gulf of Mexico and also in the Great Australian Bight many years ago. See ATVQ Vol 2 #3, and the Florida-Texas record of over 1,000 miles is detailed in ATVQ Vol 2 #1.

## GORDON'S ON FIRST

About 10 AM on July 11th I got a phone call from an excited Gordon West, WB6NOA, saying he was getting good pictures, from the KH6HME beacon site on the side of the Mauna Loa Volcano on the big Island of Hawaii on 434.0 in Costa Mesa. I checked the distance and found it to be 2495.9 miles at a bearing of 256.7 degrees.

Three years earlier Gordon had the idea to add ATV to the beacon system set up by Paul Lieb, KH6HME, up on the side of Mauna Loa Volcano on the big Island of Hawaii.

Tropo and inversion skip is some what common in the early summer months to the California coast and not unusual for 2 meter HT's to work the Hilo and Catalina repeaters; but to get a strong enough signal for ATV would be rare. The plan was to switch over to ATV for 15 minutes on the hour once the regular 432.075 CW beacon came in strong.

Gordon and I had both forgotten what gear he had took over three years ago, and thought it was a TC70-10 Transceiver driving a D100ATVN-R. Gordon said he would check with Paul on their next sked on 144.170 USB and try for a two way that evening when some of the California big guns got home.

Unfortunately, Paul said that he could only transmit ATV and had the P. C. Electronics RTX70 1.5 Watt repeater exciter and a Mirage D100ATV-R amp to drive a pair of 22 element K1FO horizontally polarized beams normally connected to the CW beacon.

Gordon said he was getting reliable video up to P4 and to put out the word. Naturally nobody came back on the 146.43 calling frequency and hardly anyone on the phone. I went down my customer list all the way from Monterey to San Diego and called anyone that was near the shore that might have a chance or could get on their local ATV 2 meter frequency.

## Got Any Liquid Wrench?

The only one who could get on and try was Mike, KC6CCC in San Clemente, but he said that it would take a little while to rotate his KLM 440-10X 11 dBd beam to horizontal. He almost broke the U clamp unscrewing the rusted nuts.

Mike is restricted from having any big antennas by his home owners association and can only mount them on a roof deck. However, he is located on a 800 ft. hill that has a line of sight path to some of the ATV repeaters and the Pacific Ocean.

He couldn't see anything on the TV at 2:15 PM so he connected the beam to his Icom R7100 to listen narrow band for sync buzz on 434.00. He detected a faint buzz at 2:27 which was improving rapidly. Switching back to the TV he got a snowy picture at 2:30 which peaked around 2:35. Signals got up to P4 with splashes of color. He quickly shot some tape off the TV and retransmitted it over the WA6SVT Santiago Peak and K6KMN Mt. Wilson ATV repeaters. The signal was in and out for the next 4 hours.

As insurance against any claim that the DX record was valid or not, Gordon, Paul, Bill Brown, who supplied the Elktronics video ID board, and myself were the only ones that knew that the altitude shown in the video ID was purposely different than what is widely known by west coast DXers and talked about on the air that day. Mike saw the right programmed altitude in the ID and purposely blocked that out when he repeated it on the local ATV repeater.

## X'd OUT AT RED BOX

The next day Gordon left his QTH in Costa Mesa and went up to Red Box, with his 10 GHz gear to try for a record on that band. He figured the absorption from trees, etc., from his location a few miles inland might attenuate the 10 GHz too much. Red Box is a Forest Ranger station at 5000 ft. in the San Gabriel Mountains north of the Los Angeles basin. He got good color pix on 434, but no luck with the X band CW.

Surprisingly, Red Box is about 40 miles inland, but the angle from Hawaii actually made this location 1.9 miles shorter than his home in Costa Mesa. The southern

California coast line swings quite a bit eastward at about 120 degrees from just above Santa Barbara. Actually, if anybody in the San Diego area had come on, they would easily take the record by many tens of miles.

Don, WA6BHF, in west Los Angeles was the third and last and saw black and white video during a peak around 8 PM. Don had his TC70-1 Transceiver connected up to his circular polarized Oscar antenna. His distance turned out to be 2473.4 miles.

## WHERE WERE THE JAMMERS?

We were very lucky during the two day opening to have very little interference. The long range search radars from Navy ships at sea usually put in three to four strong horizontal bars in the picture. It is hard to believe that there were none operating between California and Hawaii then.

Other ATVers monitored the 146.43 coordination frequency or listened in on 144.170 USB and did not transmit on 434.0. Also, no Oscar uplink activity was noted during the two day opening. I think they were down on 432.1 SSB working Hawaii DX.

The LA area ATV repeater inputs on 434.0 have also been jammed out by illegal users. There are some unscrupulous manufacturers of kits and complete video transmitters who will sell to anyone and not tell them that to put them on the air without a license for business use is illegal. So far this year, local ATVers have successfully tracked down transmissions from two businesses that were using them for surveillance. Both shut down when first confronted and informed by hams but came on again later. The second time the FCC was notified and they contacted them. $10,000 per day of operation fine can get their attention much better than reason some times.

I had already planned to go to the Big Island to run the Volcano's Marathon at the end of July so I told Paul and Gordon that I would bring a crystal controlled downconverter for a two way during the next big opening.

## GREAT CIRCLE DX AND BEARING PROGRAM

The Basic program is handy if you are a DXer and want to find the great circle distances and bearings to any point on the Earth if you know the latitude and longitude.

GPS receivers will soon be common in cars, and the price of hand helds is coming down now even to a few hundred dollars. These will give your latitude and longitude with great accuracy. They will also do what the program does, but GPS receivers don't work inside unless you have an outside GPS antenna..

GPS receivers are starting to appear on high altitude balloon flights which give the balloons latitude, longitude, altitude plus distance and bearing from the starting point. To find the distance and bearing from your QTH just use the program and put in the balloons and your coordinates. High Technology Flight, N8IYD, has the video overlay call ID board that accepts the NEMA serial data from the GPS receiver.

For your home QTH you can call and ask your cities engineering department, or check an aeronautical chart at a flying school at your local airport. Getting the latitude and longitude of the DX station is more difficult if the station you are working does not know, but checking in an atlas will get you close.

I calculated the great circle distances for the ATV DX record using the Basic program on page 16-4 in the ARRL Antenna Book 14th Edition. It has more accuracy than is probably needed. You will notice that the degree radian conversion on line 160 is taken out to 14 decimal places.

I have modified the original program in the book for Microsoft Quick Basic and present it here with copyright permission from ARRL. KH6HME is at 19-35' 19", 155-27' 10" and KC6CCC is at 33-25' 53", 117-35' 50". If you want to verify it, I came out with 2509.4 miles at 257.3 degrees. You also get kilometers and nautical miles in the printout.

If the minutes are in decimal form instead of having seconds, type that completely into the minutes and make the seconds zero.

Type it in, save it and give it a try!

## Radio Shack 33CM Rabbit Downconverter

There are many Part 15 wireless video systems out there now in the 902-928 band for very little money. The Radio Shack (15-1958) transmitter and receiver system is under $100.

All Part 15 transmitters in 33cm band are limited to a maximum radiation of 50,000 uV/meter measured at 3 meters. This works out to 1 to 5 milliwatts depending on the antenna that must be an integral part of the device and not easily changed. Most are made with simple verticals which results in snow free line of sight video up to 150 feet.

For non amateur applications and remain license free, you cannot change the transmitter power or antenna since it would obviously change the radiated power past the limit. As amateurs, and as long as we use it for legal amateur purposes, we can remove the antenna and add an amplifier.

However, most of these units use free running oscillators which have warm up drifts as much as 2 MHz in 15 minutes. They also don't have adjustable sync stretchers which are desirable when driving external amps.

The RS downconverter, however, can easily be modified for an external antenna to be used to try out the 33cm band on ATV. DX using a Part 15 transmitter can go up to 700 to 1000 feet line of sight with the addition of a 14 dBd Yagi like the Downeast, 3318LY. The downconverter is available by itself (15-2301) on special order for $49.99 at your local Radio Shack store.

The cover easily comes off with 6 screws. Unsolder the coupling cap lead from the antenna. With a pair of pliers, tear out the whip from the fiber insulator, then remove the insulator with its two screws. Bolt in a BNC connector (RS 278-105) in the hole and reconnect the coupling cap. Now you can connect any antenna you wish to do the job.

The RS downconverter has a two position switch on the back which switches the center frequency of the tuning knob. The front knob tunes over a range of 8 MHz and can easily be reset to center on the two ATV channels in your area.

To reset the knob range, first set the other switch on the back for channel 3 or 4, which ever is open in your area. Then set the front panel tuning knob in the center of its range. Switch position A is for the lower end of the band, and B the upper.

If you use 910.25 to 913.25, switch to channel A and with a known strong station on or a signal generator, adjust pot VR101 if using channel 3 output or VR103 if using channel 4 for the best picture.

If you use 919.25 or 923.25, switch to channel B and with a known strong station on or a signal generator, adjust pot VR102 if using channel 3 output or VR 104 is using channel 4 for best picture.

An interesting feature of this particular downconverter is a built-in AGC circuit so that it cannot be overloaded when the companion transmitter is right next to it. Pot VR106 adjusts this range to come in between 300 (ccw) and 3000 uV (cw). I'd leave it at full ccw for highest dynamic range.

Gain of the unit I tested was 18 dB which is plenty to reach the noise floor, The sensitivity is not as good as an amateur downconverter, such that I would recommend to anyone to go out and buy one of these units instead of one built for amateur use. If you have one, I always suggest trying something that is free first. It could be sufficient to see a local 33cm repeater output.

I measured the point at which I could just see sync bars. It was 1 uV with the RS unit, and .6 uV in a TVC-9G--a difference of about 5 dB. This difference could be made up with the addition of a good low noise pre-amp .

## DOWNEAST PRE-AMP FB

Since the summer issue, I have gotten many comments about a lot of interference going away with the added "short" we described. Some of you previously had to put bandpass filters ahead of the pre-amp s which added some insertion loss and some difficulty in keeping it all weather proof and light enough for the tower.

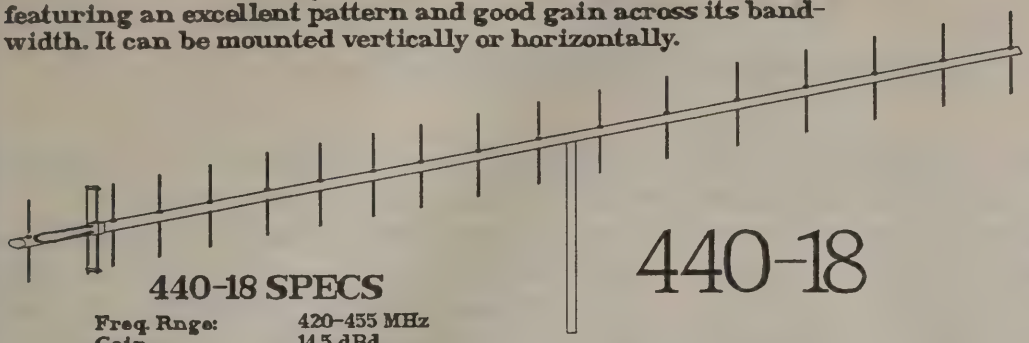
We are not stocking the "shorted" Downeast antenna mounted pre-amp s for 900 and 1200 MHz.

```
100       CLS
110       PRINT"Program to calculate great circle distances and bearings"
111       PRINT"Original program on pg 16-4 in ARRL Antenna Book 14th ed"
120       PRINT"adapted for Microsoft Quick BASIC by Tom O'Hara, W6ORG"
130       PRINT
150       DEFDBL A,B,C,D,E,L,M:DEFSTR V
160
D=1:K=111.11:M=57.29577951308238#:N=60:S=69.041:V="########"
180       PRINT"Enter negative values for South Latitudes and East Longitudes"
200       PRINT:IF D<>1 THEN 230
210       INPUT"Enter Your Latitude in Degrees ";A
212       INPUT"Enter Your Latitude Minutes ";T
214       INPUT"Enter Your Latitude Seconds ";Z1:T=(T+(Z1*.01))/60:A=(A+T)/M
220       PRINT:INPUT"Enter your Longitude in Degrees ";L1
222       INPUT"Enter your Longitude Minutes ";T
224       INPUT"Enter your Longitude Seconds ";Z1:T=(T+(Z1*.01))/60:L1=L1+T
230       PRINT:INPUT "Enter DX Latitude in Degrees ";B
232       INPUT"Enter DX Latitude Minutes ";T
234       INPUT"Enter DX Latitude Seconds ";Z1:T=(T+(Z1*.01))/60:B=(B+T)/M
240       PRINT :INPUT"Enter DX Longitude in Degrees ";L2
242       INPUT"Enter DX Longitude Minutes ";T
244       INPUT"Enter DX Longitude Seconds ";Z1:T=(T+(Z1*.01))/60:L2=L2+T
250       L=(L1-L2)/M
```

The 440-18 is a carefully computer optimized broadband yagi featuring an excellent pattern and good gain across its bandwidth. It can be mounted vertically or horizontally.

OTHER ANTENNAS OF INTEREST FOR ATV USE!

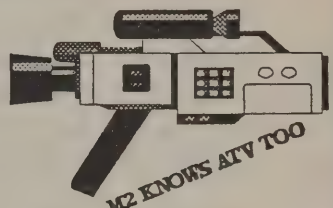
420-450-11
420-5-5
432-9WL



440-18

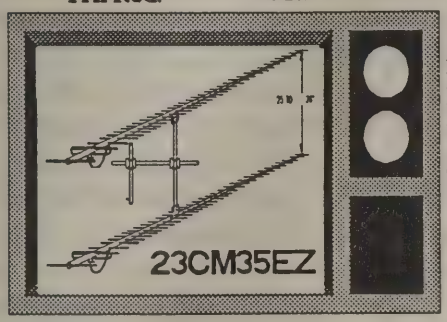
440-18 SPECS

| | |
|---|---|
| Freq. Rnge: | 420-455 MHz |
| Gain | 14.5 dBd |
| Frt to bck. | 23 dB |
| W. Area | .875 sq. ft. |
| Boom Lg | 11.33 ft. |
| Trn Rad. | 6 ft. |




ATV

Is important to us!




23CM35EZ SPECS

| | |
|---|---|
| Freq. Range | 1250 to 1300 |
| Gain | 18.4 |
| Frt to Bck | 25 dB |
| W. Area | 0.6 Sq. Ft |
| Boom Lng | 120 in |
| Trn. Rad | 6 Ft. |

M² Enterprises
7560 N. Del Mar Fresno, CA 93711
(209) 432-8873 FAX (209) 432-3059

```
260
E=SIN(A)*SIN(B)+COS(A)*COS(B)*COS(L)
270         D=-ATN(E/SQR(1-E*E))+1.57079
280         C=(SIN(B)-SIN(A)*E)/(COS(A)*SIN(D))
290         IF C1 THEN C=0:GOTO 310 ELSE IF C<-
1 THEN C=180/M:GOTO 310
300         C=-ATN(C/SQR(1-C*C))+1.57079
310         C=C*M
320         IF SIN(L)<0 THEN C=360-C
400         PRINT :PRINT"The bearing is ";:PRINT
TAB(29)USING V;C;:PRINT" degrees"
405         IF C>180 THEN C=C-180 ELSE C=C+180
407         PRINT"Reciprical bearing is ";:PRINT
TAB(29)USING V;C;:PRINT" degrees"
410         PRINT"The Great Circle Distances are: "
420         PRINT       TAB(29)       USING
V;K*D*M;:PRINT" Kilometers"
430         PRINT       TAB(29)       USING
V;N*D*M;:PRINT" Nautical Miles"
440         PRINT       TAB(29)       USING
V;S*D*M;:PRINT" Statute Miles":PRINT
450         D=0:PRINT"Press ENTER to continue"
460         INPUT"To calculate bearing from a different
location enter 1";D:GOTO 180
```

# A WORD OF THANKS

Henry:

Thank you for the box of cups. I will enjoy my morning coffee, as I read every morning, in a new cup! I really prize that mug! I will share the other three with the ground crew that helped install the repeater.

I read through the proof, and the souvenir proof copy of the February issue. It looks very nice. You did a nice job with the cover! It definitely has presence.

The Portland group has benefited greatly from the Quarterly over the past few years and are happy to add a little enthusiasm and some fresh ideas for other to think about.

Sincerely, Dennis Belles, WA7DRO

*ED: You're welcome. We only have 2 dozen left, reserved for authors and hamfests featuring ATV forums. 73 Henry*

# JULY FIREWORKS BREAK NEW 2-METER RECORDS

## Gordon West, WB6NOA

Throughout the weekend of July 9th and 10th, the Pacific high pressure system began to build up between California and Hawaii, triggering one of the strongest tropospheric ducting bank openings ever recorded between Hawaii and the mainland. The time was "on target" with several Gordon West articles in national publications talking all about the California/Hawaii VHF/UHF/ microwave path.

The KH6HME beacon was pounding in throughout the West Coast and Mexico on Sunday, July 10. It would take Paul Lieb 24 hours to rearrange his work schedule to get up to the beacon site on Monday. In the meantime, Russ, KH6FOO, could be heard "loud and clear" on 2-meter SSB, 144.200 MHz, from his home QTH in Hilo, Hawaii, just a scant couple hundred feet up from sea level. Russ and West regularly watch weather facsimile imagery transmitted on H.F. as well as 1.6 GHz, and things looked just right for some record-breaking reception reports at the mainland.

WH6VY, Al, running just 25 watts on 2-meter SSB with a single Yagi, also joined in with Russ and both stations held 2-meter SSB QSO's with West Cost stations into the wee hours of Monday morning.

When Paul Lieb arrived on the slopes of Moana Loa at 5,600 ft. elevation at the beacon location, he immediately devoted his attention to the ATV experiment set up by West. Paul would hook the PC electronics ATV transmitter with an Elktronics video ID board built in to the Mirage 100-watt ATV amplifier, and beam signals over to the mainland on 434 MHz. No one has ever tried ATV between Hawaii and California, and a P4 signal (see photos by West in last issue of ATVQ) was immediately received at WB6NOA, on a single horizontally polarized K2RIW beam. Soon KC6CCC, Mike, in San Clemente was also receiving the P3 images over a 2,300 mile path, establishing another first in the California/Hawaii tropo duct.

Paul then works Chip Angle, N6CA, on 2304 MHz CW and SSB (!), too.

Conditions continued to get better on Monday afternoon, so Paul Lieb, KH6HME, and Chip Angle, N6CA, next tried to conquer the seemingly impossible QSO between California and Hawaii, microwave 10 GHz X-band. It takes both operators about 40 minutes to change feed systems on their dish antennas to come up on 10,863.1 MHz. Unfortunately, the dimensions and geometry of this long-lasting duct did not favor the X-band frequencies, so no contact was made. Even the mass approach didn't help either--as many as five Southern California "big gun" X-band stations beaming big dish antennas toward Hawaii couldn't get through. "It will take some very special conditions for X-band to make it," comments Chip Angle, N6CA, the world's 10 GHz guru. "But working 2304 MHz over this patch will sure get the attention of the Australians and any other records that they may still hold--after this duct, they might not have any records left," quips Angle.

Gordon West, WB6NOA, will be flying over to Hawaii in August to reconfigure the ATV for the first two-way contact, and if conditions are anything like they were in July, add one additional record for the phenomenal California/Hawaii tropo tunnel.

"I gave out 300 contacts to modestly equipped stations who have never worked the duct before, and boy oh boy, were they ever excited, just like me," finalizes Paul Lieb, KH6HME." And you don't necessarily need mountain-top height either," adds Russ, KH6F00, who also gave out plenty of contacts to relatively new stations that had never worked down into the harbor of Hilo. The duct went on for two weeks, and 1994 will probably do down in history for the best conditions ever.

---

# *ATVQ ON LINE AMERICA*

***You can reach ATVQ via America on line. Just address your E-Mail to ATVQ. ATVQ is also in the ask an expert area of Ham Radio section. E-Mail is checked every week day and Ask and Expert is checked once a week. We think this is better than just adding another BBS since anyone on America On-Line can read the conversations, ask questions and get answers vie the E-Mail. You can also place orders for ATVQ items using E-Mail directly to ATVQ mailbox. This will give you the fastest response next to sending us money in the mail!***

# CENTRAL ILLINOIS/ST. LOUIS AREA AMATEUR TELEVISION CLUB

## Tenth Annual ATV Production of

### the Old Settlers Parade

### Doug Over, KA9HDZ

One of the most gratifying events I have ever been privileged to participate with is held every year in Hillsboro, IL. The Old Settlers Parade is an annual event. It's multi-faceted celebration is enjoyed by many in the community. Many residents of the community with close ties to the "Old Settlers" are not able to get out and enjoy the car show, Coronation of the Queen, carnival, and three parades.

Using Amateur radio and the media of Fast Scan Amateur Television, a small crew has been able to bring some measure of joy to the residents of the hospital and two nursing homes.

After many days of preparation, the antennas were mounted at each facility before the parade. No need waiting for the last minute! About noon, on parade day, the volunteers started arriving from as far as Troy, Salem, Gillespie, and Ramsey, Illinois.

Each location needed the feedline run inside, the down converter connected to the monitor, and split the signal into the distribution systems. The in-house systems may be MATV, distribution of off the air TV reception, or that of CATV, distribution of the local cable system. One facility had both!

A brief run down of the production: Two cameras were switches at the main transmitter site, running 900 MHz. On foot, feeding current parade information to packet operator Reba Mathis, N9END, was KF9MQ. Camera operations, Mark Osborn, WA9SXK, and Harold Mathis, KD9SG, did the excellent video again.

The 900 MHz signals were received by chief engineer Scott Millick, K9SM at his residence. A multi-channel mixer, complete with picture-in-picture, combined the previous days video for set up testing, and allowed glitch free changeovers. The packet channel provided the digital update required for studio grade background audio commentary.

After the incorporation of this state-of-the-are manipulation, the signals were retransmitted on 439.25, via two 27 element beam antennas. These antennas had separate aiming for the 110 degree azimuth difference. Each receiver had a 12 element beam, mounted at 40 feet.

In a valiant effort to overcome past trauma, Carlos Arzugas, WD9T, did the chores of retrieving the antenna at the Hawthorne site. It was only last year that Carlos broke his back and wrist in a fall from a tower job!

Fortunately, we had good signals and minimal problems this year. In fact, Scotty indicated that it took ten years to get it right! As always, the residents enjoyed our efforts, almost as much as we enjoyed Kathy Millick's, WB9QLY, nutritional delights!

Many thanks to Scott and Kathy for their long suffering and dedicated efforts to the community

Some familiar callsigns and fellow club member: K9SM, WB9QLY, WA9SXK, WD9ENR, KD9SG, N9END, K9RRP, KD9CN, KF9FV, WD9T, KA9HDZ, KF9MQ.

---

## "CQ GANG" AWARD KICKS OFF ANNIVERSARY CELEBRATION

(Hicksville, NY) -- The editors of CQ: The Radio Amateur's Journal will celebrate the start of the magazine's 50th anniversary year with a special operating event during the first half of January, 1995. Any licensed amateur who is currently or formerly associated with CQ, any of its sister publications (e.g., Popular Communications, Communications Quarterly), or other products of its parent company, CQ Communications, Inc. (e.g., CQ books, videos and specialty products) is invited to sign "/50" after his/her callsign between January 1st and 15th. Other hams may qualify for the "CQ Gang" award by contacting these stations. "Very few magazines are privileged to celebrate their 50th anniversary," said Publisher Dick Ross, K2MGA, in announcing the ward. "And we certainly would not be here today if not for the dedicated hams who have been our writers and editors through the decades. This event at the very beginning of our Golden Anniversary celebration is our way of saying 'thank you' and of putting the spotlight on those people who are so directly responsible for our success." Complete rules for the "CQ Gang" award appear in the November, 1994, issue of CQ, and will be available by mail directly from CQ.

# FIESTA DAYS

from ATV News by Mary Stone, AB6VI

Fiesta Days, an annual event held every year in Vacaville, was the site of an ATV field day for five days from May 25th to the 29th.

Because of many problems in the past at this event, the local police department come to the Vaca Valley Amateur Radio Club and the County Office of Emergency Services looking for volunteers.

These volunteers would walk the grounds and report dangerous activity, via their Ham radios, to a net control in the police mobile command trailer.

Several Hams from both the Vaca Valley Radio Club and the Solano County Amateur Radio Society Club came up with the idea of using ATV.

Andrew's Park, where the vent is held, has a tall building adjacent to it and rom the roof most of the park can be seen.

We did ATV from the rooftop at last year's Fiesta Days using one camera and an AEA ATV transmitter that sent the signal to a television we had set up in the mobile command trailer.

The police were so impressed that we were near the top of their list of people to contact when setting up security for this year's Fiesta Days and also asked if we could set up more cameras.

Since we only had one ATV transmitter (434 meg) we started looking around for another. We had thought of using my 1.2 GHz transmitter that's set to the Diablo ATV repeater using only one watt and a directional beam but were worried it would have caused interference with the Diablo repeater.

With time running out and using limited resources, we went out and purchased a "Rabbit" video transmitter and receiver. The "Rabbit" is made by Gemini Industries and cost about fifty dollars.

We replaced the short six inch antenna on the back of the transmitter with a BNC connector that then went into a high gain 900 meg antenna.

We field tested the "Rabbits" and made sure they would do the job for us as we had to transmit the signal to the command trailer approx two hundred and fifty feet away from our roof location.

So with the AEA 434 meg ATV transmitter and our "Rabbits", we were all set to go on the first day of the event.

Two televisions were set up in the command trailer and a two meter voice link was set up between there and the camera operators on the roof.

Using two handheld video cameras, about eighty percent of the grounds could be covered by camera, and the video transmitted to the command trailer where a net control and police supervisor were posted.

Many times the police would ask that we zoom in on a group that looked like they may get out of hand. If everything stayed quiet, officers would not need to be sent to check, saving police resources for use elsewhere.

One person was even arrested after an officer recognized him as a wanted person. The officer had been watching our video transmission on the television in the command trailer when he spotted the subject.

On Saturday, May 28th, the video crew ran late because of work and traffic. We were about an hour behind setting up the video transmissions.

When I walked into the command trailer to set up the televisions, there was a sad group of about six officers looking at the corner where the televisions would normally have been set up. When they saw me with the televisions they all wanted to know where I had been, how long before they could start getting video, and how much they missed not having the video.

We also kept getting a steady stream of visitors to our rooftop location that included several officers, cadets, and other hams.

Everyone also commented that the video was outstanding and many stated it was just as good, if not better, than what they get from their cable system at home.

We made no attempt to hide the cameras or our activity on the roof and placed the cameras in plain view of anyone in the park. We hoped this would deter any trouble if the trouble maker knew they were on video.

To keep within FCC ID rules a TNC was set up to transmit a call sign on the voice channel of both transmitters.

Along with the ATV gear, we also used binoculars, scanner, and a cellular phone to keep up-to-date on what was going on and keep in touch. There were also numerous hams who were on foot in the park calling in suspicious activity and telling the camera crew where to point the cameras.

The following hams helped set up and operate the ATV gear: Dave, KD6IAI; David, KD6ZQD; Kevin, N6QGV; Jim, KB6NRG; and, Mike, KD6VOA.

# California Creativity

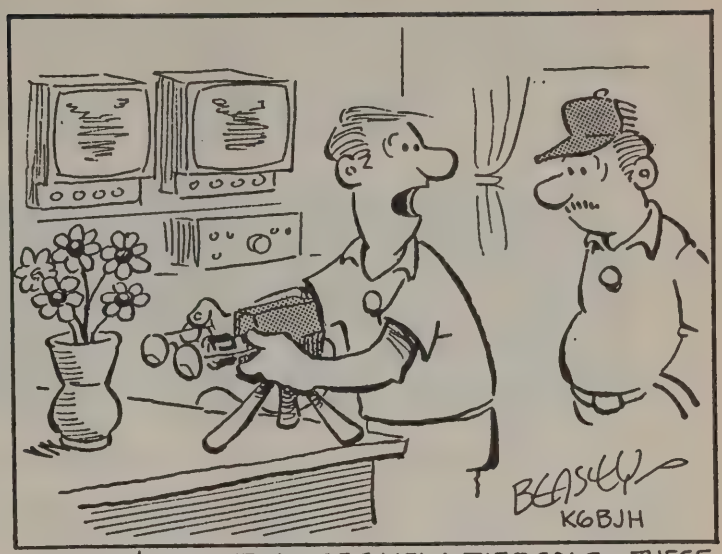
*Bits from ATV News:*

## ATVQ make nice QSL

Mary Stone reduced her ATV Quest certificate to post card size to make an attractive QSL card.

## Mt. Diablo ATV repeater

now averages over 20 check-ins. with reception as far away as Bakersfield thanks to a new link-up. Watch on 427.25 and listen on 147.06 + PL 100 hz, Thursday at 8:15 PST.




GUESS I'LL HAVE TO GET NEW BIFOCALS--THESE WON'T EVEN GIVE ME A CLOSE-UP ON MY CAMERA

## FOR SALE

Videonics Titlemaker $200, AB6VI, 209 467 1503

# ATVer says Titlemaker is Great!

Thank you for placing my name on your mailing list for *Videonics Direct*. I am the proud owner of the original Video Title Maker, which, after frustration with an incompetent local dealer, ordered it through an East Coast mail order house. Until now, I am satisfied with the "original" model Title Maker, but your newsletter has made my mouth water for the New Video Title Maker 2000! (Why does industry do this to us? My Macintosh became obsolete the day I brought it home!)

Seriously, I have used my Title Maker several times for demonstrations in my unique corner of the video hobby: Amateur Radio Television (ATV). I may have convinced more than one radio ham to get a Title Maker! Most recently, I used the unit to create scrolling displays on the ham callsigns which were winners of the hourly prizes awarded during the local "swapfest." Several hundred attendees were impressed with the continuous update of the display. I transmitted the date via a 900 MHz video link to three color monitors placed around the large auditorium. One valuable asset we find is the ability to display a slashed zero Ø for the many ham callsigns that contain both the letter "O" and the zero "". I have written several articles in ATV magazines recommending the Videonics Title Maker.

I recently read in *Videonics Direct*, issue No. 12, that DirectED is upgradable to DirectED PLUS. My question is: Can the Title Maker be upgraded to a Title Maker 2000? I need to disseminate this to other owners, if possible. Meantime, I will try to find someone who will purchase my earlier model, so that I may become the new owner of a '2000'!

Please identify for me a Colorado re-seller that is competent to fulfill my needs. I am sorry to have missed the Seminar in Denver on July 16, 1994, but my copy of *Videonics Direct* didn't arrive until July 21, 1994. I will look forward to the next seminar. Please keep me on the mailing list. (I may have something to offer.)
Oak Stockton, KROL

# CAATN MEETING

**John Jaminet, W3HMS**

The quarterly meeting of the CAATN was held on Saturday night, September 24, 1994, in Dover, PA near the site of the annual York Hamfest. John Jaminet, W3HMS, served as MC for this, the 6th Annual York ATV meeting now incorporated into the CAATN schedule of quarterly meetings. Twenty-seven people attended. Following dinner, the Chairman's Comments were made by Ron, K3ZKO.

Next, the representatives of several cities gave reports of their activities. Ron Cohen, K3ZKO, of Philadelphia reported on their activities which centered around their repeater. Bob Bennett, W3WCQ, reported on the activities in the Baltimore region, principally the installation of a bank limiting filter built by Jerry Buckwalter, AA3HB, of Alpha Components in Mechanicsburg, PA. Then Dave Stepnowski, KC3AM, of Delaware reported on their activities with their repeater project.

Special thanks were extended to: Paul Seman, W3CSU, for collections and services as Treasurer; John Shaffer, W3SST, for the Newsletter which announced the meeting; and, the Official Greeters, Dave, N3LZP; Dick, WA3USG; and Harry, N3KYR.

Once again, the meeting was recorded by John, W3HMS, for the benefit of our aTV friends in Switzerland, France and Belgium.

A demonstration of the York Cross-band 33 cm/70 cm ATV repeater was made by Bob Storm, WB3EAF and John Schaffer, W3SST. Bob and John showed us the computer controlled Bulletin Board installed at the KVHFC clubhouse and remotely linked to the repeater. A VCR is available for remotely playing activity tapes. Several cameras, also remotely controlled via touchtones, are available for selection. One is a skycam situated at the top of our 195 ft. tower which can be rotated remotely. It gives a great view of the countryside out to the horizon. The other cameras are an inside and outside security camera.

Next. the functions of Power Dividers and Phasing Harnesses for stacking antennas for ATV, etc. were explained by Jerry Buckwalter, AA3HB. Following Jerry's briefing, John, W3HMS led an ad hoc group discussion on building a local repeater which focused on power limits, ideal antenna types, bands to use, polarization, converters, etc.

We again heard from AA3HB about "Filters for Ham TV" in which he described what can be done with an interdigital filter. He also addressed the criteria and parameters for the filter built for the Baltimore repeater as addressed previously by Bob Bennett.

The final event was a demonstration by Bob Storm, WB3EAF, of a one-way video link between Ernie, EB3DVL, in Baltimore, MD transmitting to the Baltimore repeater on 439.25 MHz. His signal was repeated on 911.25 MHz by the Baltimore repeater. His signal was received on 911.25 MHz at Bob's QTH then retransmitted on 439.25 MHz to the York ATV repeater which retransmitted the pix on 426.25 MHz and 923.25 MHz. The pix received at the restaurant on portable equipment was surprisingly good. Bob has shown us all that repeater linking is possible!!

The wrap up was made by the Chairman, Ron, K3ZKO. The next meeting will be held on Sunday, November 27,1 994 at Poor Jimmy's Restaurant in Northeast, MD. For additional information, please contact John Jaminet, W3HMS at 717-697-3633 or John Shaffer, W3SST at 717-764-4805.

# LISATS MAKES HISTORY!!!
# FIRST ATV FROM CAPE!!!

K4RBD, K4GCC, and Phil Chen, KC4YER, successfully sent ATV to the repeater from Cape Canaveral Air Station during the Atlas launch on Friday, June 24, 1994. Positive results of the exercise were: No interference to Cape or BCTV operations; knowledge gained on time available to set up and where/how to set up the ATV antenna and camera. Thanks, Phil, for getting press passes for LISATS

**33 & 23 cm LISATS ANTENNAS AWAIT NEW WLRQ TOWER**

The 315 foot WLRQ tower on which LISATS antennas rest is being replaced by a new 400 foot tower just a few feet away. The management of WLRQ has had to overcome several legal hurdles in the permitting process in order to proceed with construction. They passed the County Commission last week and the project should be completed soon.

LISATS' present 70 cm receive and transmit antennas will be moved over at their same heights. When feasible, the 70 cm receive antenna will be moved up as high as possible with a 9913 coax extension onto the 1 5/8 inch hardline at 315 feet.

New 10dBd 23 and 33 cm vertical omni antennas will then be installed when permissible and connected to the new 23 and 33 cm receivers, which in turn will have their video/audio outputs fed into the controller for user selection.

P.C. ELECTRONICS 2522 PAXSON LANE ARCADIA CA 91007-8537 USA
TOM (W6ORG) & MARYANN (WB6YSS) O'HARA (818) 447-4565
24 hr FAX order line (818) 447-0489

# THE ATV TWINS

**THE LOW COST PROGRESSIVE ALTERNATIVE TO A TRANSCEIVER**

**Made in U.S.A.**

**TX70-1b Transmitter only *$279* delivered UPS TVC-4G Downconverter $89**

**Not Sure what ATV is all about and your hobby budget's tight? Start with the tried and true TVC-4G Downconverter to see the action for just $89. Then later, when you want to transmit, just add the TX70-1b companion Transmitter at only $279.**

**TX70-1b SPECIAL FEATURES:**

* Two frequency 1.5 W p.e.p. transmitter properly matches linear amps with adjustable internal sync stretcher & blanking level on the time proven KPA5 transmitter board
* Built-in RF T/R relay board switches antenna and applied 13.8 Vdc between transmitter amd your external ATV downconverter
* Full 25 kHz dev. broadcast standard 4.5 MHz sound subcarrier with independant mic and line audio controls allow voice over commenting while showing home video tapes. Accepts low impedance dynamic mics with "Push to Look" switch.
* Transmit RF detected composite video outputs to monitor phono jack on back to see what you are transmitting. In receive you see your own direct camera video at this jack to enable focus and lighting set-up before flipping the switch into transmit.
* RCA phono jack camcorder or VCR composite 75 Ohm video and line audio inputs, type N 50 Ohm antenna input, and 50 Ohm BNC output to downconverter connectors
* Small rugged shielded cabinet - 7.3 x 4.7 x 2.1", 1lb. 11 oz.

Just plug in your camera,VCR, camcorder, etc. composite video and audio, 70cm antenna, 12 to 14 Vdc @..5A, and you are ready to transmit live action color or black and white pictures and sound to other amateurs. Specify 439.25, 434.0, 427.25 or 426.25 MHz transmit frequency. 1 crystal included, second crystal add $15.

*Transmitting equipment sold only to licensed Tech class or higher radio amateurs verified in the Callbook for legal purposes. If newly licensed or upgraded, mail or fax copy of license.

**WHAT ELSE DOES IT TAKE TO GET ON ATV?**

Any code free Tech class or higher amateur can get on 70cm ATV with full color and sound. Any video camera, camcorder, VCR or computer with a composite video output can be plugged into the front panel phono jacks for both audio and video transmission.

Start by selecting a 70cm antenna and connecting a TVC-4G downconverter to your TV set to receive. Add the Transmitter along with your camcorder and 13.8 Vdc from a regulated power supply capable of .5 Amps and you are on the air. It's easy!

DX with TX70-1b's and FO22-ATV antennas line of sight and snow free is over 22 miles, 7 miles with the 440-6X normally used for portable uses like parades, races, search & rescue, damage accessment, etc. For greater DX or punching thru obstacles add either of the ATV compatible 15, 50 or 70 watt amps listed below.

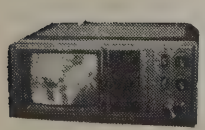
The TX70-1b has full bandwidth for color, sound and live action just like broadcast. You can show the shack, home video tapes, computer programs, repeat SSTV, weather radar, or even Space Shuttle video if you have a home satellite receiver. See ARRL Handbook chapters 20 & 7 for more info and Repeater Directory for local ATV repeaters.

## BUY BOTH AND SAVE $19

**If you order both the TX70-1b and the TVC-4G at the same time, the special package price is $349**

Most telephone orders shipped within 24 Hours

## COMPLETE 70CM ATV STATION

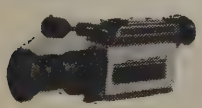

Your TV set

+

+

D26N

+


Your video camera or camcorder

+ **TX70-1b-$279 & TVC-4G-$89**
+ **ATV Xmit & Rec**
**1.5 Watts p.e.p.**

**13.8 Vdc** Power Supply required

Optional matching Amplifiers
Mirage D15N 15 Watts RF out ....$176
Mirage D26N 50 Watts RF out.....$249
Mirage D100ATVN 70 Watts out.$359

Antennas see page 5
KLM 440-16X 14dBd .....$139
KLM 440-10X 11 dBd .....$77
KLM 440-6X 8.9 dBd .....$60
RUTLAND FO22-ATV 15.8 dBd $119

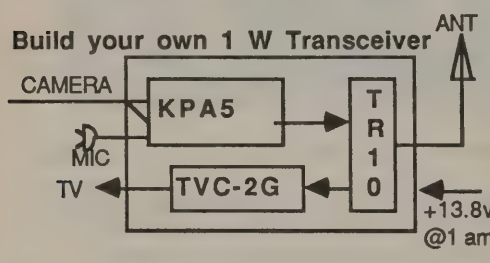
Remember when comparing prices, ours include UPS surface shipping. 10/94

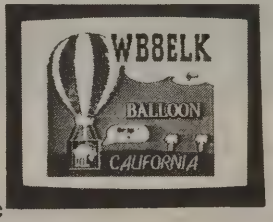
**2509+ Mile DX set with our gear, KH6HME to WB6NOA & KC6CCC - - - Can you beat it?**
**HAMS, call (818) 447-4565 now for your complete 10 page catalogue of our ATV products!**

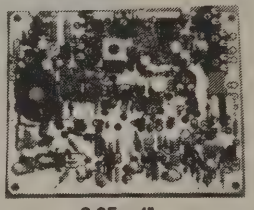
P.C. ELECTRONICS 2522 PAXSON LANE ARCADIA CA 91007-8537 USA
TOM (W6ORG) & MARYANN (WB6YSS) O'HARA (818)447-4565
24 hr **FAX** order line (818) 447-0489

# ELECTRONICS ,THE "KREEPIE PEEPIE" ATV TRANSMITTER

**THIS IS THE ATV TRANSMITTER BOARD YOU HAVE READ ABOUT THAT HAS SURVIVED MANY BALLOON FLIGHTS TO OVER *100,000 FEET* AND BACK. ALSO USED FOR R/C MODELS WHERE AN ALL IN ONE BOARD WITH SOUND IS DESIRED OR DEDICATED LINKS AND REPEATERS. JUST THE THING FOR THE BUILDER WHO WANTS TO PACKAGE AND MAKE HIS OWN PORTABLE 70 CM ATV TRANSMITTER OR HOME TRANSCEIVER WITH A WIRED AND TESTED BOARD.**



3.25 x 4"

**KPA5-F board only $169**

## KPA5-F 70CM ATV XMTR BOARD FEATURES:

- 1.5 Watts P.E.P. typical RF output. Run barefoot for portable, but if needed for greatert DX, the output properly matches the Mirage D15N 15 watt, D26N-ATV 50 Watt linear amp for full output or D100TVN to over 70 Watts with its adjustable sync stretcher. Same board as used in TX70-1b.
- FULL COLOR AND SOUND on a small 3.25 x 4" board
- Wired and tested board runs on external 13.8 Vdc @ 300 mA. supply or 12 V battery. Weighs only 3 oz.
- Accepts composite video from cameras, camcorders, VCRs, computers, etc. 2 audio inputs, one for low Z dynamic mic, & one line level from most cameras & VCRs. Transmit monitor output enables seeing your own true RF detected video.

## KPA5 APPLICATION:

*PORTABLE CORDLESS TV CAMERA.* Think of it as a video HT. Place the KPA5 in one of the L.M.B. Diecast aluminum boxes, Diamond RH77CA half wave on top or at the end of 50Ω coax attached to a headset. Plug into a 12 to 13.8V source such as a 12 Vdc battery pack. Depending on terrain & receiving antenna DX is typically over 1 mile. Then at home with Rutland FO22-ATV antennas at both ends DX is >22 miles snow-free line-of-sight.

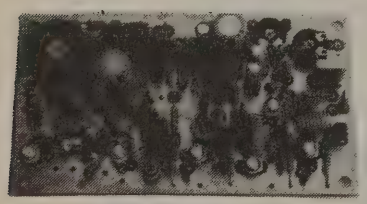
**Price only $169** supplied with one crystal on 426.25, 434.0, 427.25 or 439.25. 2nd xtal add $15. Has 2 relay switched crystal sockets. Specify frequency(s) when ordering, check with local ATVers, ARRL Repeater Directory or call us. Sold only to code free Technician class or higher licensed radio amateurs.

## ACCESSORIES:

**L.M.B. CAB247** 7.3x4.7x2" roomy aluminum box.....**$22**
**CAB234** 4.6x3.6x2" aluminum box, smaller tighter fit.....**$14**
**100 Ohm carbon panel pot** for video gain control.....**$5**
**TR-10** RF T/R relay module, mounts on chassis N conn.....**$29**
**TVC-4G..$89 or TVC-2G..$49** Downconverter (pg 5)
**RG174** 50 Ohm 1/10 inch dia. coax cable, 6ft.....**$3**
**MIRAGE D15N-ATV** 1.5 in /15 out all mode amp.....**$176**
**MIRAGE D26N-ATV** 1.5 in / 50 out all mode amp.....**$249**
**MIRAGE D100TVN** 1.5 in/70 out all mode amp.....**$359**

**DIAMOND RH77CA** 2/70cm omni antenna, BNC, 15".....**$30**
**450 ISOPOLE** omni 4 dBd vert. gain antenna, N.....**$89**
**KLM 440-6X** 8.9 dBd ant., 28" boom, >50 deg. BW.....**$60**
**KLM 440-10X** 11.2 dBd, antenna, 64" boom.....**$77**
**RUTLAND FO22-ATV** 15.8 dBd antenna, 14 ft boom...**$119**
**UG21** type N male connector for Belden 9913 coax.....**$5**
**UG58** N female flange type chassis connector.....**$2**
**800J** 10 pin VHS color camera chassis female connector..**$10**
**1000 pF Feed-thru Cap** for R/C or repeater buildiers.....**$4**

## SMALL TXA5-RC 1 WATT ATV TRANSMITTER.....$129

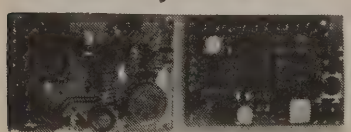


TXA5-RC 2.25 x 4"

**Shipped within 24 Hrs. of your call**

Designed primarily for Radio Control models, rockets, balloons, etc. with it's small 2.25 x 4 inch size and 2 oz. weight. Adjustable power output from 1.5 p.e.p. to 100 mW. Draws 350 MA @ 13.8 Vdc and 1 Watt, 200 ma at 100 mW. Has adjustable sync stretcher and provisions for sound from the FMA5-F board (pg 2) in case your application needs higher power sometimes or subcarrier sound. Comes wired and tested ready for you to mount in a shielded enclosure, connect up coax from antenna and camera and wires to power source. Plan on shielding your R/C receiver and adding the simple antenna low pass filter supplied with the application note. Receive with one of our 70 cm downconverters listed on page 5 and a TV set. Specify freq., 426.25 MHz suggested for R/C, other standard ATV freq. avail.

**TXA5-70a** board can also be used for R/C applications where 2 frequency capability is desired. Same size as TXA5-RC but 80 mw.for .25 to 5 mile DX, or add 10 Watt PA5 amp for 3 to over 100 mile line of sight DX. See page 2....**$89**



ATVM-70 Transmitter MSC-2 Sound

**MICROTEK ATVM-70 MINI ATV transmitter board.....$209**
Only 1.0 x 1.3 inch, wired and tested board. See article in July 91 73 Magazine page 9. Nominal output 80 mw. Capable of driving the PA5 for higher power. Requires 7.0 to 10.0 Vdc maximum at <100 ma. Only 434.0 MHz is available with the SAW oscillator. Also Great for R/C models, robots, demos or short links. Snow free line of sight DX1/4 mile dipole to dipole or up to 5 miles with Rutland FO22-ATV antennas.
**MSC-2** companion 4.5 MHz sound subcarrier board, same board size as ATVM70.....**$59**

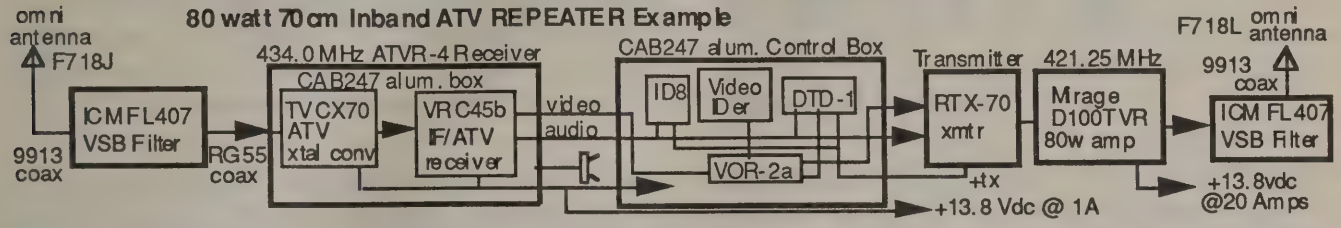
**HAMS, call (818) 447-4565 for your complete 10 page catalog of our ATV products! We have everything you need to get on the 400, 900 and 1200 MHz bands.** **10/94**

P.C. ELECTRONICS 2522 PAXSON LANE ARCADIA CA 91007-8537 USA
TOM (W6ORG) & MARYANN (WB6YSS) O'HARA (818)447-4565
24 hr **FAX** order line (818) 447-0489

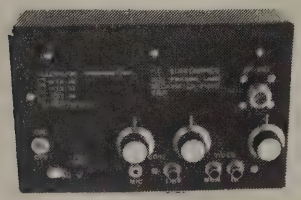
ELECTRONICS

# READY FOR AN ATV REPEATER OR LINK IN YOUR AREA?

## WE HAVE THE MODULES AND SOURCES FOR INBAND OR CROSSBAND




Select an RTX Transmitter and a ATVR Receiver for the bands you want, add the appropriate linear amp,VSB filters & antennas, ID & VOR-2a, power supply and coax for your own repeater. We suggest low in / high out for crossband. Ask for a copy of our 8 page ATV Repeater App Note including recommended sources of filters, antennas, video IDers, etc. before you start so you can do it right the first time. Most can put together a good working ATV repeater for under $2000.



**TRANSMITTERS** ready to go in a 7.3x4.7x2 die cast aluminum box for tight RF shielding. >1 Watt p.e.p. output for proper drive to companion amplifiers. Adjustable sync stretcher to enable set up of the right video to sync ratio after an amplifier is added. Independent mic and line audio inputs. Requires 13.8 Vdc at 500 ma.

**RTX-70** specify output frequency, 421.25 MHz most popular rptr. output .....**$279**
**MIRAGE D100ATV-R** 90 Watts p.e.p on ATV continuous duty 70cm repeater amplifier see page 2 for more info and picture .....**$539**
**RTX-33** specify frequency - 923.25 MHz most used frequency .....**$329**
**RTX-23** specify frequency - 1253.25 MHz best rptr output freq. (available in October)
We suggest Downeast Microwave for 900 MHz (3318PA ) and 1200 MHz (2318PAM or 2335PAM) repeater amps to match our transmitters. Call them at (207) 948-3741.

**RECEIVERS** ready to go in a 7.3x4.7x2 die cast aluminum box for tight RF shielding. Contains a TVCX crystal downconverter and VRC-45b receiver. Two composite video outputs, squelched speaker and line audio outputs. Requires 13.8 Vdc at 300 ma.

**ATVR-4** specify frequency - 439.25 or 434.0 most popular for inband or crossband repeater input .....**$299**
**ATVR-9** specify frequency - 910.25 most popular repeater input.....**$309**
**ATVR-12** specify frequency - 1253.25 link, 1277.25 repeater input.....**$329**

**VOR-2a Video Operated Relay board...$45**, keys RTX upon detection of horizontal sync plus 10 min. & end of transmission momentary relay for switching to video ID to meet FCC regs. Pots for sensitvivity, hang & ID time. 1.75x3.5".
**ID-8 Automatic Morse Audio Identifier...$89**, Communications Specialists board has 8 programmable and selectable messages up to 200 characters, CW 1-99 WPM, ID time 1-99 minutes, and more features in Non-volatile EEPROM memory. Includes programming key pad. Output up to 4 V p-p. Size 1.85x1.12x.35. Req. 6 to 20 Vdc @ 6 ma.
**DTD-1 DTMF Decoder...$59**, Communications Specialists board decodes up to 4 programable digits for latched or momentary relay driver output. Use for remote repeater on/off, video switching, etc. Size 2.0x1.25". +7 to 16 Vdc.
**LMB CAB 247** 7.3x4.7x2 die cast aluminum box. Great for control housing VOR-2a, DTMF and ID boards...**$22**

## ANTENNAS

When comparing prices remember ours include delivery by UPS surface in the contiguous USA.

**70cm**
**F718** (L,J,A - specify video carrier frequency) Diamond vertical omni 9.3 dBd gain, 15 ft long.....**$238**
**440-6X** KLM 8.9 dBd gain 420-450 MHz 6 element beam. 28" boom, end mounted.....**$60**
**COY4327EL** Swiech 10 dBd 420-450 MHz 7 element beam. 4 ft boom, end mounted.....**$60**
**440-10X** KLM 11.2 dBd gain 420-450 MHz 10 element beam 64 " boom, end mounted.....**$77**
**440-16X** KLM 14.2 dBd gain 420-450 MHz 16 element beam 10.5 ft boom, center mounted.....**$139**
**FO22-ATV** RUTLAND 15.8 dBd gain 420-450 MHz 22 element beam 14 ft boom, center mtg.....**$119**

**33cm**
**FP-19** Comet vertical omni 10 dBd gain, 7 ft 4 in long. Covers 902-928 MHz.....**$119**
**3318LYARM** Downeast Microwave 14.2 dBd gain 902-928 MHz beam. 6 ft boom, end mounted....**$95**

**23cm**
**F1230** Diamond 1200 MHz band vertical omni 11.3 dBd gain, 10.5 ft long .....**$163**
**2424LYRM** Downeast Microwave 16.2 dBd gain 1240-1300 MHz beam. 6 ft boom, end mounted..**$95**

**DOWNCONVERTER DISCOUNT** of 10% is available to Repeater groups and clubs if you order 5 or more per item of the tuneable downconverters on pages 4 or 5. Special discount for Teacher Hams who will use ATV in classroom. The order must be sold and shipped to one person at one time. It helps to have some extras available for new people to try out your repeater or use at demos at other clubs and schools. Higher quantity discounts: 5-24 =10%, 25-49=15%, 50-99=20%, 100 up=25%.



Remember when comparing prices, ours include UPS surface shipping

**Hams, call (818) 447-4565 for your 10 page catalog & repeater application note!** 10/94

# FORT WAYNE HAMFEST & COMPUTER EXPO

**Allen County Amateur Radio Technical Society**
**Don A. Gagnon, WB8HQS**

It was about this time last year that I last contacted you about the Fort Wayne Hamfest & Computer Expo, and it's that time of year again. I have been doing this for several years now, hoping to entice you to join us.

We once again had a great year and continued our rock steady pattern of growth in 1994. To show this to you, please permit me a few moments to outline our last three years progress:

| | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|
| Total attendance | 4800 | 5400 | 6000 | ???? |
| Flea Market tables sold | 626 | 626 | 641 | 804* |
| Premium tables sold | 156 | 156 | 181 | 262* |
| % preregistered | | 33% | 45% | 55% |

*This is the number available, and history tells us we'll likely sell out.

We have sold out for the last three years, with 1993 running out of premium (commercial) tables 7 weeks ahead and flea market tables over 2 weeks ahead (not to mention the more than 70 table requests we had to turn away). For 1994, we have expanded into adjacent exhibition hall with our total space exceeding 152,000 square feet and 1066 total tables!

This past year, we continued our broadcast radio advertising campaign, expanding to 14 stations covering more than a 140 mile radius around Fort Wayne. Next year we plan on expanding ever further and our 8 page mail out flyer has been praised both near and far for the amount of information it provides. A copy of our 1994 single page handout is enclosed for your review.

And now for some details on our event in general. Our 2 day event is held in a 152,000 sq. ft. temperature-controlled, smoke-free, indoor facility. We provide drive-in loading and unloading, electrical hookups and on-site food services. The Fort Wayne Hamfest & Computer Expo also encompasses technical forums, license exams, and ladies activities. Based upon vendor and attendee surveys, people are very happy with our event, the facilities and the people.

Having said that, we would once again like to invite you to one of the Midwest's premium hamfests. This is our 22nd year and it promises to continue the history of growth and prosperity. The 1994 Fort Wayne Hamfest & Computer Expo will be held on November 19th and 20th, and with optimum premium spaces going fast (remember that over 55% of our 1993 tables are already reserved for 1994), we would highly recommend that you make your reservations as early as possible. You can call me at 219-484-3317 (evenings) or 219-487-5172 (on weekdays), or drop me a line at our post office box and I'll be happy to answer any questions you may have or talk about any special needs.

Each premium location sells for $30. This encompasses a space that is 8 ft. wide by 10 1/2 ft. deep and includes a standard 8 by 2 1/2 ft. table and a blue curtain backdrop. In addition, the premium aisles are a full 15 ft. wide, as compared to the already larger than average 12 ft. flea market aisles. An electrical hook-up is $25 extra. Additional tables for use behind your front tables are $10.00 each. We also have flea market tables available for $15 each. All prices cover both days of the event.

We would be very please to have you join us in 1994 as we believe you'll find, as others have, that our hamfest is one that keeps people coming back year after year. I look forward to hearing from you and sincerely hope we will have a chance to see you in November.

# HOUSTON AMATEUR TELEVISION SOCIETY,

Greetings. Quite a bit is going on in HATS right now. Let me list a few things to be discussed at the next regular meeting on September 14.

First, we must vote on an amendment to the By-Laws. This amendment will designate that upon dissolution of the Society, any equipment will be donated to another bonafide tax-exempt corporation. This is necessary to qualify as a tax-exempt organization, ourselves. It will also save us $15/month service charge at the bank.

Second, I will present a report on ATV in Dallas. I recently attended a meeting of the Dallas ATV community and will describe some changes to their repeater system.

Third, we will have reports on the status of the 23 cm FM transmitter kit testing. This system has been undergoing refinement since its flight on BLT-9. Recently, it has been flown on RC model airplanes.

Fourth, we are ready to kick-off the manufacture of ATV (421.25 MHz) antenna kits.

Additionally, the W5PZP repeater has been on the air and is being continuously refined. The "billboard" computer recently failed and has been repaired and returned to service. The HATS VS-100 repeater controller has been moved to the PZP receiver site and integrated into the system. Both sites are now capable of touchtone control. We will have a report on how to use this control system at the Wednesday night meeting. If you haven't been watching Channel 57, get your system back on-line.

Time for our regular monthly meeting and there are several items of interest. First, we will get an update on the 1.2 GHz FM transmitter Beta boards. Those at the last meeting had the unexpected opportunity to ante up for one of the beta kits at $30. At last count, Jeff had taken orders for 7 beta kits! Hopefully, delivery of the kits will be early November. There may be a couple more available. Check with Jeff (KC5AWJ).

We have been having on-going discussions with Link system operators and are preparing to perform a polarization change on the PZP repeater from vertical to horizontal. This test is to determine the effect of polarization change on interference both to and from link equipment operating in the 420-426 MHz region. We will let you know when this test period will be so you can make the necessary polarization change to match the repeater. It is hoped that this test will show enough benefit to make a permanent change desirable.

Also, we are planning to move our meeting location to another room in the HP building that provides window access in the direction of the repeater. Hence, we will again be experimenting with airing the club meeting over the PZP repeater. Because we will not be next to the lobby door, we will be monitoring 146.700 (simplex) for anyone coming late who needs access. Try to be there by 7:15 pm, if possible. If there is no one to let you in, give us a call of 146.70 simplex and we'll send someone to get you. If you don't have a handheld, give us a call earlier to expect you.

---

Finally, please note in your calendar the following dates of hamfests and sidewalk sales.

**November 13,** Sunday, 7 am - 4 pm. Flea Market and Hamfest to replace the "94 Houston Ham Convention. There will not be the regular hamfest this year. Instead there will be an indoor flea market and auction. Already, there is a new organization forming to replace the old convention group. This new organization will have representatives from all Houston ham clubs. HATS will certainly participate in this!

**September 24,** Saturday, 7 am - Noon. First Annual Swapfest of the Chaparral Amateur Radio Club, Seguin, Tx. McQuenney Lions Club Community Center, McQueeney, Texas.

**October 8,** Saturday, 7 am - 3 pm. Ham Expo '94, Bell CountyExpo Center, Belton, Texas (Temple Amateur Radio Club).

**October 22,** Saturday, Sunrise - Noon. Manchaca Sidewalk Sale, Manchaca, Tx (Just south of Austin, Texas.)

**November 5/6,** Saturday - Sunday. Odessa Hamfest Convention. Holiday Inn Convention Center, 6201 E. Business I-20, Odessa, Texas.

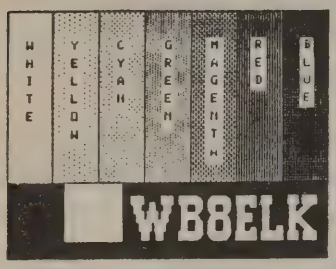
**March 18/19,** 1995. St. Patrick's Day Swapfest, Midland, Texas.

If you want more information on any of these events, there will be flyers available at the meeting on Wednesday evening. (9/14/94).

---

# ELKTRONICS

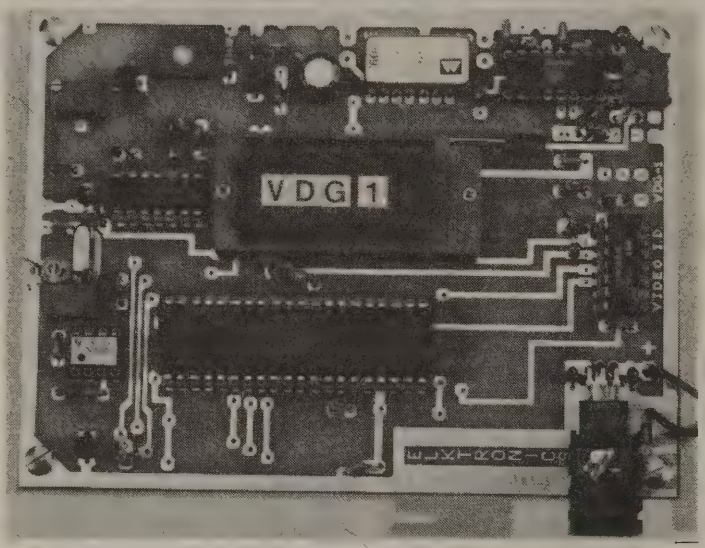
12536 T.R. 77
Findlay, OH 45840
(419) 422-8206

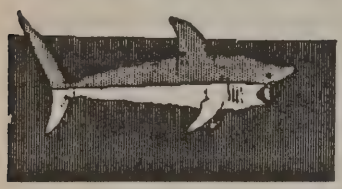


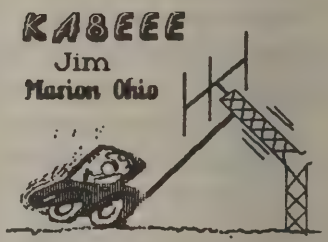

INTRODUCING THE

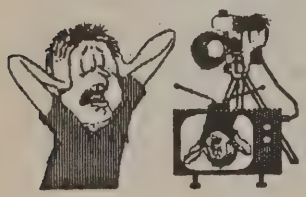
**VDG-1**

**VIDEO I.D.**

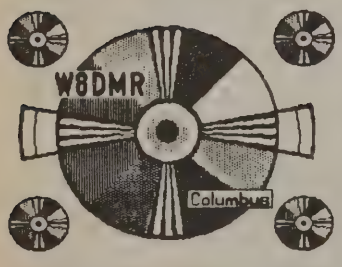


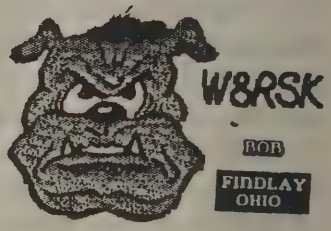


- Instant Video Source
- 4 Graphics Screens
  (2 Hi-RES / 2 Colorbar)
- 12 V D.C. Operation
- Video Relay for switching in
  live camera video
- Built-in Sequencer/Timer
  (Steps through all 4 screens)




**VDG-1 with Pre-Programmed
Custom Callsign Logo**

**- $99 ppd.**

**(Quick-release socket option)**

**— $10**

**Call or Write for CATALOG
of available Graphics**

**Additional Programmed EPROMS
- $19**

**Now available as a Kit
-$89 ppd. Blank PCB - $19**

# ATV COUNTRY STYLE

## Bill Grieb W4BEJ

Elizabethtown, Kentucky is a small country town about 40 miles south of Louisville and about 80 miles west of Lexington, Kentucky. Our local area takes in Fort Knox (home of our gold), Radcliff, Bardstown (my old Kentucky home), Larue County (birthplace of Abraham Lincoln).

We have a local amateur radio club of about 150 members. The club's name is Lincoln Trail Amateur Radio Club and it now owns two 2-meter repeaters (one in Radcliff and one in Elizabethtown), one 440 repeater, a packet node and now, an ATV repeater. All of the repeater radio equipment we have is commercial (Motorola) but when we started to look at ATV repeaters, we didn't have as much to choose from.

Our Technical Committee, which consists of Mike, KE4NS, and myself, decided we would have to put the repeater together ourselves. Looking through the ATV magazines, we found a lot of different parts, receivers and transmitters and finally decided what we would use. We gathered all the prices together and submitted it to the Club. I really didn't think they would approve it since $3,000 (not counting the antenna) is about twice the amount we paid for the other repeaters. It was approved so Mike and I ordered the parts. We ordered the receiver, exciter, video operated relay and mirage 70 watt amplifier from Tom in California (PC Electronics). At that time, Tom warned us that we might have interference from the 440 repeater in the same building. We ordered the filter from International Crystal and the duplexers from RX-TX.

Once all the parts started coming in, we were in "hug heaven." We started putting all the parts together using two Motorola micor cabinets. To make sure the transmitter didn't get into the receiver, (very common problem with 2 meter repeaters), we put the exciter, receiver, video operated relay, video ID (which we bought from WB8ELK) and a power supply in one cabinet. WB8ELK went out of his way to make the IDer for us and it is great. It took forever to get it, but it was worth the wait.

The other cabinet contained an Astron 35 amp power supply, the Interdigital filter from International Crystal, and the Mirage 70 watt amplifier. We ran out of room in that cabinet so we had to put the RX-TX duplexers on the outside of the cabinet. We connected everything together with double shielded coax. We used a 16 bay (folded Dipole commercial) antenna which was vertically polarized and 7/8 hard line.

The first problem we ran into was video from the transmitter keeping the repeater keyed up. Since it was Dayton Hamfest time, I waited and talked to Tom from California. He said we needed a filter on the video input to the exciter ($5.00). I bought a bag of parts and wondered why he didn't tell us about it sooner.

After Dayton, I put the filter in the exciter and guess what? It worked! Everything was working fine and just in time for our bad weather season. Well, the wind huffed and puffed until it broke our antenna in half. We are off the air again.

I ran across an article about an ATV antenna that was horizontally polarized and showed it to Jim, KB4NFK, who is one of our club members that can build anything. He worked for a long time and made the antenna much stronger than the article called for. We put it up on the water tower and it worked great for about four weeks. Once again, the wind blew it off the tower and we are off the air again. We sure were having a hard time keeping the repeater up and running.

KC4TX, also a club member, got permission from the local FM station, WQXE, to put our antenna on top of a 200 foot tower. That was great except we had no antenna. I read an ad about the slot antenna that WQCD was building and asked the club to vote on buying a slot antenna. Well, they voted to buy one and I ordered it. This took almost as long to get as it did to get the WB8ELK IDer. At this point, we were off the air more than we were on.

We received the antenna and Larry, KC4TX, put it up on the tower. We are now seeing pictures from everywhere. By moving the ATV repeater to the new location, we got rid of the interference from 444.8 and 146.9 repeaters. The ground level is 925 feet above sea level and we are up on top of a 200 foot tower using much larger coax.

Our ATV repeater input is 439.25 MHZ and the output is 421.25 MHZ. I have seen a balloon from Dayton, Ohio, swapped pictures with W4HTB in Bowling Green, Kentucky (85 miles south) W4VXP in Cambellsville, Kentucky (about 45 miles southeast), and I've had a report from Evansville, Indiana (about 90 miles west). I am running a bear foot AEA VSB-70 (1 watt). I know AEA doesn't make them anymore but if you have a chance to get one, but it. It is built better than any other ATV equipment I have seen and it doesn't look home made.

We have already had an ATV mobile. We have some club members with a radio control plant that has ATV. Now all we need to do is put it all together.

My next project is to put up a camera outside to watch for bad weather. The Louisville National Weather Service has a 2-meter station set-up that is used when the weather is bad. Maybe ATV is next. It has taken over two years to get everything working but the repeater has been flawless.

# ATV AUDIO SQUELCH

Brian Pliler, KFWD

Circuit Operation

As you will see in the project's schematic diagram in Figure 1, the composite video signal from the "host" receiver (VCR) is fed to the project via jack J1. Capacitor C1 blocks and DC voltage present at jack J1 but allows the video to pass freely. Transistor Q1, along with resistors R1, R2 and R3, not only amplifies the video signal, but with the help of capacitor C2 and diode D1, also "clamps" the video signal to approximately .7 volts. This simple insures that the most negative-going portion of the vidEo signal, namely the horizontal sync signals, will never fall below the .7 volt DC bias level set by diode D1.

Transistor Q2 performs the job of "sync detector" and is configured as a common-base amplifier. Resistor R6 and diode D2 set transistor Q2's base bias to approximately .5 volts DC. Without a video signal present, transistor Q2 is forward biased (due to R6 and D2); thus causing Q2's collector to be pulled down towards ground through emitter resistors R4 and R5. When a video signal is present, the negative-going horizontal sync pulses counteract or cancel the forward bias present at Q2's base; thus repeatedly forcing transistor Q2 into cut-off and allowing its collector to be pulled-up toward 5 volts through resistor R7.

Capacitor C3 is included to filter out the effects of random noise in order to prevent the project from tripping falsely during the absence of a video signal. The recovered sync pulses from Q2's collector are then amplified by transistor Q3 before being fed to a voltage doubler stage consisting of capacitor C4, diodes D3 and D4, and resistor R9 which converts the recovered horizontal sync pulses into a positive DC voltage that is used to charge capacitor C5.

Resistor R11 insures that C5 discharges when the received signal disappears. The charge on capacitor C5 is fed to the non-inverting input of U1 (an LM311N voltage comparator IC). Trimmer resistor R12 is the project's "squelch" control and is used to set the threshold voltage that is applied to the inverting input on U1. As long as the voltage level present at the non-inverting input of U1 (pin 3) is greater than the threshold voltage level applied to the inverting input of U1 (pin 2), U1's output at pin 7 is considered to be high (near +5 volts). If the voltage level applied to the non-inverting input of U1 (pin 3) falls below the threshold voltage level applied to the inverting input of U1 (pin 2), U1's output is forced low. Diode D5 and LED1 are used to absorb the small offset voltage output from U1 when its output is low. Alternatively, they can be replaced with an equal value zener diode if desired.

Capacitor C7, along with resistors R13 and R14, determine the attack and decay times of the muting/unmuting processes. When U1's output is high, transistor Q4 is turned on. This not only activates the relay and allows the audio to be passed, but also prevents transistor Q5 from conducting. As soon as U1's output goes low, transistor Q4 turns off, thus opening the relay and muting the audio. Transistor Q5 now receives base current through K1's coil and resistors R15 and R16 which instantly causes the project's mute indicator (LED 2) to illuminate.

Resistor R15 was necessary in order to allow the relay in the prototype to release when transistor Q4 is turned off. This is due to the high coil sensitivity of the reed relay used in the prototype and the loading effects caused by R16 and Q5; therefore, depending on the type of relay used in your project, R15 may or may not be needed. Keep this in mind if your project fails to operate correctly.

Power is supplied to the circuit via an LM78L05 voltage regulator IC. Capacitors C8 and C9 filter the supply from transients, while diodes D7 and D8 prevent murphy from inflicting damage to your project arising from incorrect power supply polarity. Power requirement for the project are so small (under 25ma.), that most any power supply can be used.

Hook-Up and Use

After connecting the project to your ATV gear (see Figure 3), apply power to the project. With your receiver tuned to an inactive frequency, slowly adjust trimmer resistor R12 just to the point where the project's mute indicator illuminates. (Note: The received audio signal is instantly muted.) Now tune to an active frequency and confirm that the mute indicator extinguishes and receiver audio is heard once again. This adjustment process should be repeated several time in order to maximize the project's sensitivity.

After you use the project for a while, I hope that you find it to be invaluable and wouldn't even consider parting with it. (No matter how many offers you get from fellow hams.)

# ATV AUDIO SQUELCH

ATV AUDIO SQUELCH PARTS LIST

Resistors (all resistors 1/4 watt 5% unless otherwise noted)

R1, R2, R6, R13 - 10,000 ohms
R3 - 330 ohms
R4, R5, R8, R10, R14 - 1,000 ohms
R7 - 22,000 ohms
R9, R11 - 100,000 ohms
R12 - 10,000 ohms pc-mount trimmer (screwdriver adjust)
R15, R16 - 4,700 ohms
R17 - 470 ohms

Capacitors

C1, C5, C6 - luf 16 wvdc electrolytic
C2, C4, C7, C8 - 10uf 16 wvdc electrolytic
C3 - 330 pf 50 wvdc ceramic disc
C9 - 100uf 16 wvdc electrolytic

Semiconductors

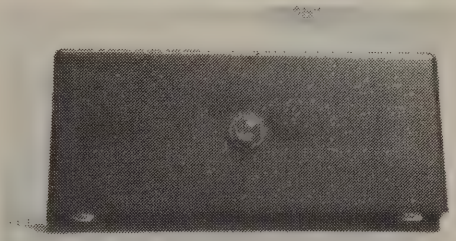
D1, D8 - 1N914 small signal silicon diode
Q1, Q5 - 2N3904 npn general purpose switching transistor
U1 - LM311N voltage comparator ic
U2 - LM78L05 5 volt 100ma. voltage regulator ic
LED1 - Red led (see text)
LED2 - Red jumbo led

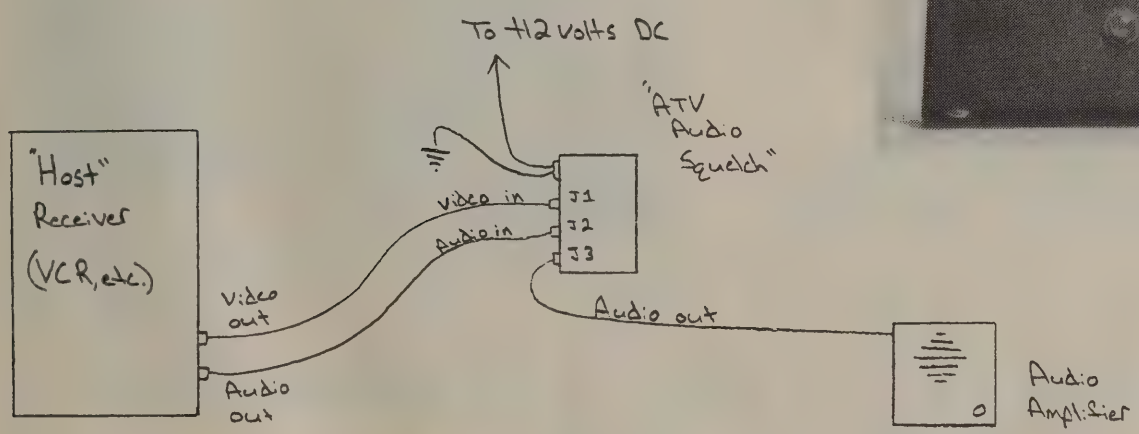
Additional Parts

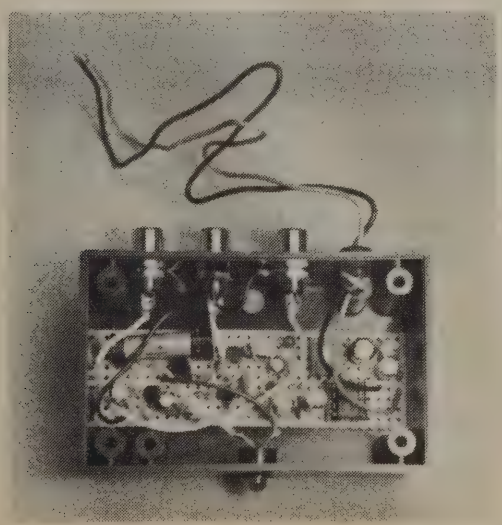
J1, J3 - Panel mount phone jacks
K1 - reed relay 5 volt coil 1 amp contacts

Miscellaneous

Wire, solder, enclosure, led bezel, etc.

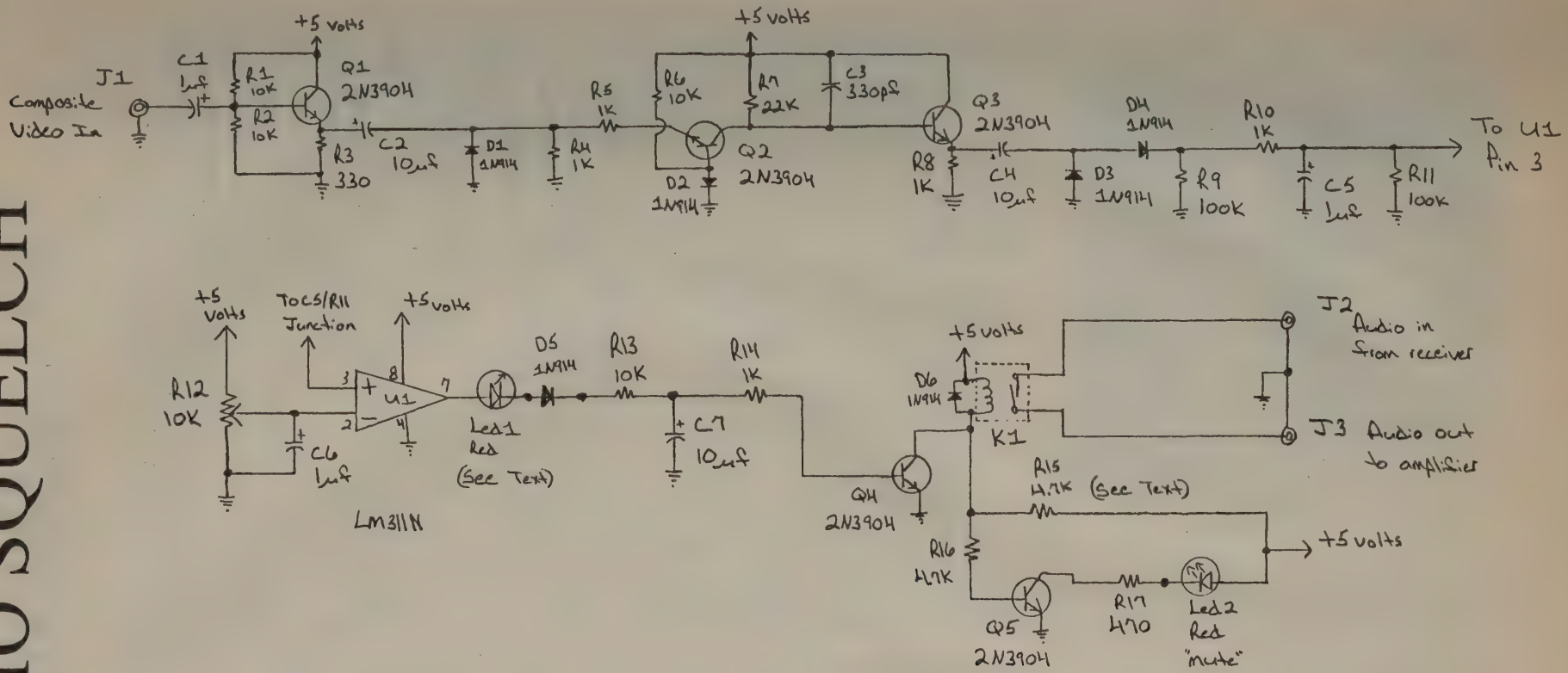




I THINK I'LL GO AHEAD AND INVENT TELEVISION- I'VE ALREADY DEVELOPED THE TRIPOD FOR THE CAMERA

# ATV AUDIO SQUELCH




123

U2
Pin-out
Bottom View

1. + 5 volts out
2. Ground
3. VCC input (12 volts)

"ATV Audio Squelch" 7-18-94

(Video operated Relay)


Brian Pliler KFØWD
113 N.W. AVE.
R#2 Box#482
Baxter Springs, Ks. 66713
316-856-3349

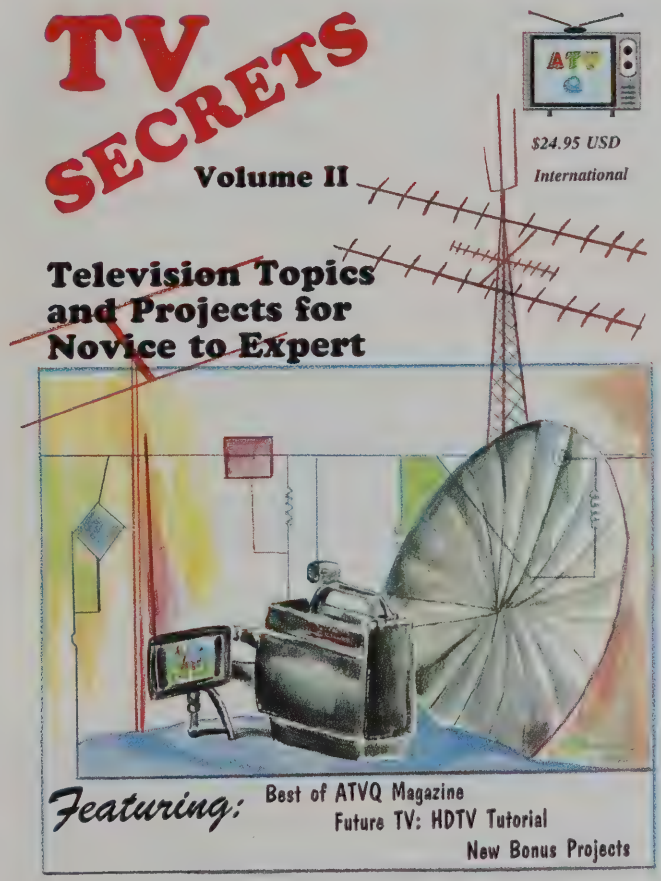
# ATV BOOKS

THE BEST OF BOTH WORLDS

NON TECHNICAL

TECHNICAL

ATV SECRETS
FOR ASPIRING ATV'ERS
$9.98 US
ATV
International Edition
Volume I
Everything you wanted to know about ATV but didn't know whom to ask!
First Edition
FEATURING:
HAM TV ON EARTH AND IN SPACE
GET STARTED: HAM TV CHEAP AND EASY
FUN WITH HAM TV
PUBLIC SERVICE HAM TV
THE SKY WAS THE LIMIT: BALLOON, ROCKET & R/C ATV
NASA SPACE SHUTTLE ATV
INDEX TO OVER 500 ARTICLES, FEATURES, BUILD-IT PROJECTS FOR ATV
HAM TV, NO CODE REQUIRED!
ALL YOU NEED IS A LITTLE IMAGINATION!
AND ANY CLASS HAM LICENSE!
FINAL CHECKOUT OF STS 37 ATV GEAR FOR SAREX. NASA Photo.




## ATV SECRETS

volume one,

FOR ASPIRING ATVers,

AS REVIEWED IN OCTOBER 1992 ISSUE OF QST.

ATV SECRETS is a great place to start your ATV adventure. Its 64 pages are tightly packed with succinct information to cover all aspects of getting started, where to find activity, equipment, how to DX, and answers frequently raised questions of power, antennas, vestigial sideband operation and more. It also includes an index to over 500 items which have appeared in ATVQ Magazine. Everything you need to know to enjoy ATV in one place!

**$9.95 plus $1.50 post (US), $1.90 (Canada) $2.90(DX)**

## TV SECRETS

volume two,

for advanced ATV'ers,

As published in the October 1992 issue of QST.

A mammoth book, with **292 pages** of technical material. **Over 40 authors** present **over 90 technical projects** and theory topics to fully acquaint anyone from novice to expert in the how and what of TV, video and ham TV. Divided into 11 chapters, the book presents tested projects for all areas of interest in ham TV including antennas, amplifiers, repeaters, receivers, transmitters, video accessories and more. Suitable for all knowledge levels from novice to expert.

**$24.95 plus $2.90 post (US) $3.80 (Canada) $6.50(DX).**

# ATV BOOKS

From the BATC available through ATVQ

## ATV COMPENDIUM

104 pgs. 8.25 x 5.75 1989

A collection of projects and useful topics from issues of CQ-TV, compiled by Mike Wooding G6IQM. A high quality work with projects that work in both NTSC and PAL video systems. The BATC offers circuit boards and kits for most items they publish at reasonable cost. This book is OUT OF PRINT. A limited quantity of copies are on hand.

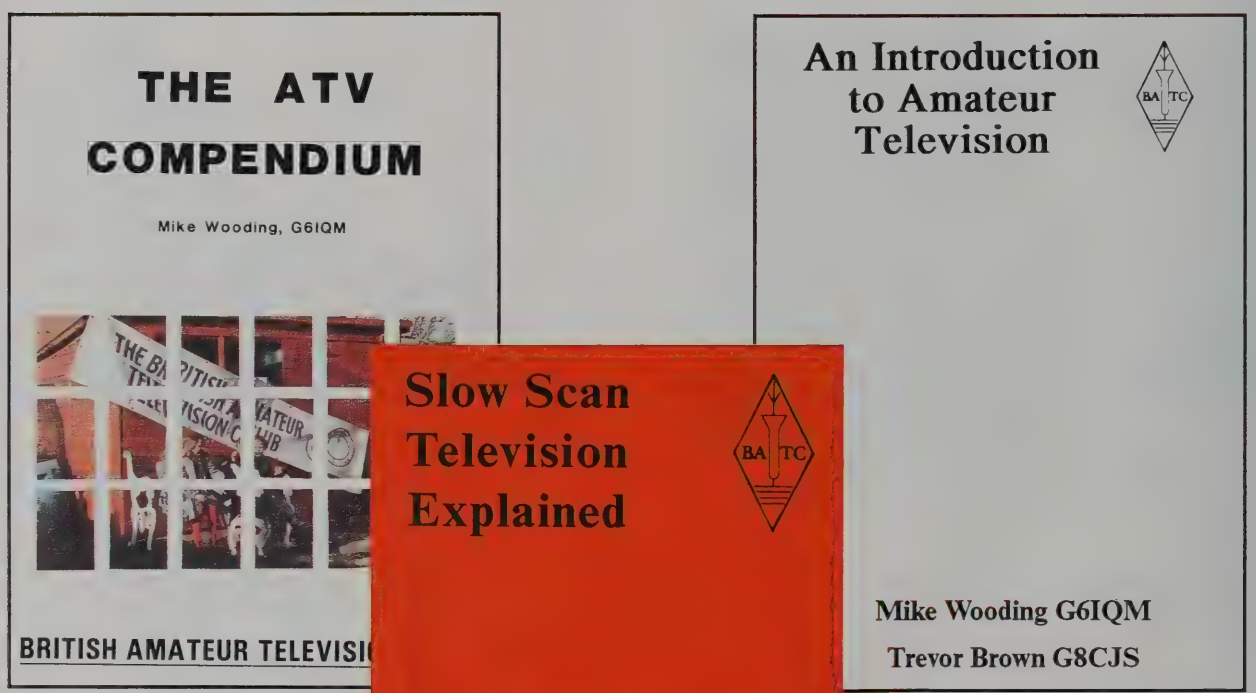
**Available from ATVQ at $14.95 POST PAID.**

## AN INTRODUCTION TO AMATEUR TELEVISION

154 pgs. 8.25 x 5.75 1992

A collection of projects and useful topics including 24 cm ATV and a modular remote control station. Written and compiled by Trevor Brown G8CJS and Mike Wooding G6IQM. A high quality work. Circuit board layouts are provided and most projects are available as circuit boards or kits from the BATC at reasonable cost.

**Available from ATVQ for $14.95 POST PAID**




# SLOW SCAN EXPLAINED

**The latest word in SSTV!**

Now you can find the latest information about SSTV in one place. The newest book from the BATC contains all the current modes including the Scotty modes. Also included are complete descriptions of popular commercial equipment, home studio operation and tips for good pictures, examples of various video modes and construction projects for a complete SSTV station.

The written explanation of how SSTV works and the various modes is the best ever written. Everyting you need to know in one place to enjoy SSTV as never before. Includes color operation as well.

**Available from ATVQ for only $14.95 post paid.**

# ATV MAGAZINES

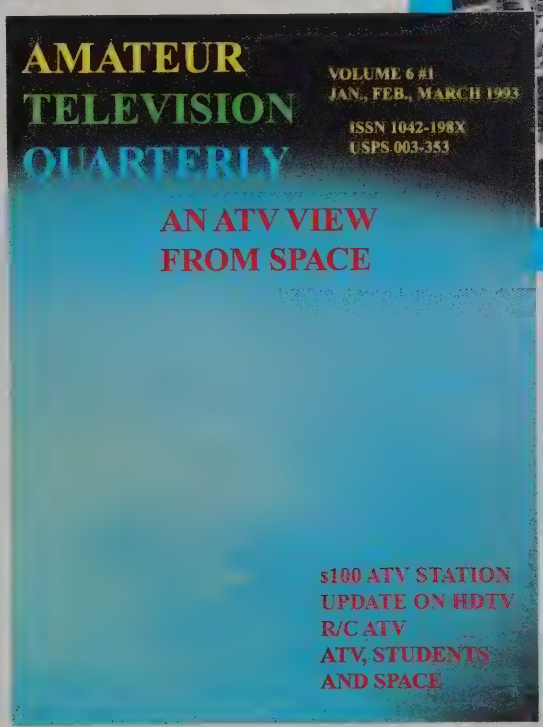
## CQ-TV

A quality quarterly publication covering mostly British ATV activity, club news and usually several good technical projects per issue. Typically 100+ 5.75 x 8.25 pages per issue. Most projects will also work or can be adapted to NTSC standards from PAL.

Covers video, ATV, SSTV, ATV repeaters with construction projects. Most projects also have circuit boards and kits available at reasonable cost from the BATC.

USA residents may subscribe via ATVQ for $21/yr which includes all foreign funds exchange fees.

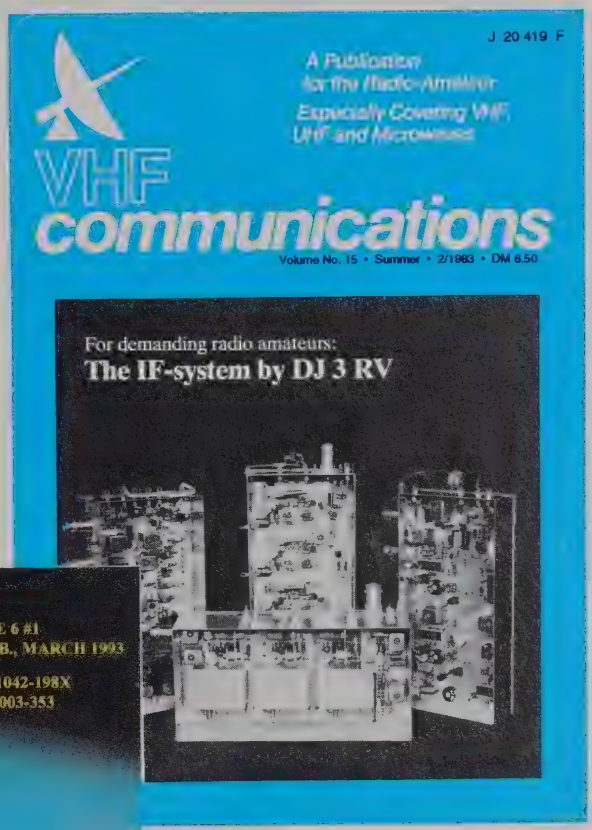
**ATVQ** Continuing the heritage of great US ATV publications, with topics and projects for all levels from novice to expert, plus FCC news, club and operating news, equipment reviews, build-it projects, covering all aspects of ham TV including FM-TV and HDTV.




## VHF COMUNICATIONS

A high quality technical publication with mostly technical projects for VHF-UHF, Microwave and ATV. Projects are reknowned for their quality. The publication also offers PC Boards and kits for projects. Probably the best technical ham radio magazine today! Authors are world famous hams and articles are technically sound.

USA residents may subscribe via ATVQ for $27/yr which includes all foreign funds exchnage fees.




Published four times per year. a must read for any video hobbist. Just the facts without hype. $18/yr US, $22 Canada, $29 DX. multi-year discounts, see order page. ATVQ sponsors the annual friday night Dayton ATV Party featuring expert speakers, live demos, socializing and ATV fun. Published by Henry KB9FO and Bill WB8ELK.

# I GOT MINE, DO YOU HAVE YOURS?

***CLOSE OUT SPECIAL***

The ATVQ Indian Head Test Pattern coffee mug. Just the thing to add class to your shack and hold your favorite beverage! Holds 12 oz. This fine china mug is a limited edition with the famous test pattern on one side and the famous ATVQ logo on the other. The colors are TV black for the art work and antique tan for the cup. Shipping weight is over a pound! This is a quality product and not available anywhere else. Show your video hobby with pride or use as great gifts for video friends.

Only $5.99 plus postage ($2.90 US, $3.50 Canada). Satisfaction guaranteed!

**ORDER FORM:** **>>PUBLICATIONS<<**

> ATV SECRETS for Aspiring ATV'ers: Vol 1. An introduction to Amateur Television 64 pages 100 illustrations. — $11.45 post paid _____

> TV SECRETS, Topics and Projects for Novice to Expert: Vol 2. 90 technical projects 292 pages none bigger, none better! — $27.75 post paid _____

>>>SPECIAL: Both Vol 1 and Vol 2 of ATV Secrets..... — $34.95 post paid _____

> **An Introduction to Amateur Television,** BATC, 156 pages, ..... — $14.95 post paid _____

> **ATV Compendium,** BATC, 104 pages..... — $14.95 post paid _____

> **Slow Scan Explained,** BATC, 150 pages ..... — $14.95 post paid _____

> Full Color test chart set, color bars, registration, gray scale, frequency response on 4 sided heavy enamel stock ..... — $5.00 post paid _____

> ATVQ Indian Head test pattern 12 oz. coffee mug. Fine china collectors item..... — $8.69 post paid _____

> ATV IS FUN AND INEXPENSIVE, 8 page handout for ATV demos, clubs, hamfests, to build interest and activity.....pkg of 25 ..... — $5.50 post paid _____

> **>>VIDEOS<<**

> An ATV Balloon Adventure. 30 min on VHS. Watch as KB9FO in Chicago, DX's a 1 watt ATV signal launched on a balloon from Dayton Ohio. Shows how to find signal, tracking, advantage of preamp, live action with narration and intro and wrap-up. Great for ATV demos, hamfests and club meetings. NO MUSIC! ..... — $6.49 post paid _____

> TV Bloopers. Remastered from HI-8 and 3/4". Nearly 12 hours of US TV Bloopers (US set) and 12 nearly 12 hours of foreign TV bloopers. Rated R/X. (N,L, S, adult themes!) Varied quality due to multiple sources and vintages of material. Includes classic gags, commercials, goofs, stumble toungs, "Christmas" events and broadcast and non broadcast material.

US set — $59.95 post paid _____

DX set — $59.95 post paid _____

BOTH (24 hrs!) — $99.95 post paid _____

> **>>SUBSCRIPTIONS<<** — $21/yr _____

> CQ-TV from BATC. 4 issues per year, subs run by calandar year. ..... Good technical and operational material, kits — $27/yr _____

> VHF Communications. 4 issues per year, subs run by calandar year. Excellent technical material and projects, kits — years _____ $ _____

> ATVQ, A must read for any ATV'er. 4 issues per year. Factual, topical, informative, the #1 source in the western hemisphere!

TOTAL $ _____

| RATES | US | CANADA | DX |
|---|---|---|---|
| 1 yr | 18 | 22 | 29 |
| 2 yr | 32 | 39 | 49 |
| 3 yr | 45 | 49 | 69 |
| 4 yr | 59 | 65 | 89 |
| 5 yr | 75 | 80 | 109 |
| LIFE | 359 | 399 | 499 |

**Send to: ATVQ, 540 E. Oakton St., Des Plaines, IL 60018**

**VOICE MAIL INSTANT ORDER LINE**

**708 298 2269 FAX 708 803 8994.**

**VISA/MASTERCARD ACCEPTED.**

# A TRANSMIT/RECEIVE SEQUENCER FOR ATV OPERATIONS

Mike Dees, N3EZD

Are you tried of throwing several switches to put your ATV station on the air? I was. So, I built this sequencer.

My ATV station contains transmit/receive relays in the driver amplifier, the final power amplifier, and in the mast-mounted pre-amplifier. The final power amplifier and the mast-mounted pre-amplifier are bypass type relays to bypass the devices on receive, and the driver amplifier's relay connects the antenna to the receive downconverter during receive. Although the mast-mounted pre-amp I use in my ATV station is rated for RF activated switching to the 150 watt level, I felt that the life of the pre-amp and other devices in the transmitter chain could be extended by not hot switching the various T/R relays. I have had problems in the past with the hot-switched T/R relays in amplifiers after extended use.

I have been manually switching out the pre-amp before energizing the transmitter; this proved to be somewhat inconvenient and unreliable. Although the PA and pre-amp are designed for RF sensed switching, I had an uneasy feeling each time I inadvertently sent 100 watts up the feedline to the back end of the GaAs FET pre-amp while it was still in the receive mode. I decided it was time to automate the process, eliminate the wear and tear of hot-switching and to incorporate automatic video identification at the end of transmissions. I use an Elktronics video display board for generation of ID screens; this board contains a relay to switch the video ID to the video line when the board is energized. I included control circuity in the sequencer to automatically send the video ID for a brief interval at the end of a transmission. The ID board was mounted in the sequencer enclosure and the controls moved to the front panel. The video display board was also modified to provide 16 screens.

The logic circuit for transmitter and ID control was built from a 4011 QUAD 2-input CMOS NAND gate. To inhibit the sequencer and prevent the activation of the transmitter chain on power up of the sequencer, a timer was added to disable the control signal to the sequence generator for a few seconds after power is applied. The various timers are simple RC circuits on the logic gates and the sequence generator. (See Figure 1.)

For the sequence generator, I used the LM3914 LED dot/bar display driver. This IC contains a ten stage linear voltage divider, a voltage reference, and 10 comparators with adjustable current-limited open-collector outputs capable of sinking up to 30 ma. The comparator outputs will be activated sequentially as the input voltage increases. (See Figure 2.)

The circuit is straight forward. IC1a is the ID timer, IC1b is the ID control logic, IC1c is the power-on disable timer, and IC1d inverts the control signal. To start a transmit sequence, close the transmit switch contacts; to return to receive, release the contacts. The circuit is powered from 12VDC.

Resistor/capacitor combination R1/C1 controls the ID interval, R2/C2 controls the length of time the sequencer is disabled on power up, and R3/C3 controls the speed of the sequencer. The values of these components may be adjusted to suit your preference or the fixed resistors changed to potentiometers for easy adjustment. Front panel control of the ID time is convenient.

The NAND gates may be types 4011 or 4093 Schmidt triggers. I have tried both and both operate satisfactorily. I find no noticeable difference and the 4011 are more readily available. A pin-out diagram for the 4011 or 4093 is shown in Figure 3.

The LM3914 provides 10 outputs. Selection from among these outputs may be used to control the relative delay between the various devices. The timing for the LM3914 outputs is not linear due to the simple R3/C3 timing network. i did not consider it necessary to linearize the timing delays for this use; to do so would have added to the circuit complexity and not offered any significant advantage.

Interfacing the LM3914 to your various devices can be accomplished in several ways. Perhaps the easiest is with the use of relays. Radio Shack sell a relay (175-005) that operates on 18 ma with 7 to 9 volts, has contacts rated for 2 amps and cost $2.99. Other alternatives are solid state switching using bipolar or power MOSFET devices. Considering the cost of some MOSFET devices, particularly the P-channel devices, the relay may also be the most cost effective route; it also provides good isolation for the external device. However, for my sequencer I implemented the control circuitry using all solid state control.

# A TRANSMIT/RECEIVE SEQUENCER FOR ATV OPERATIONS

Examples of output interface circuits are provided in Figures 4 through 8. Interfaces using relays, bipolar and MOSFET devices are illustrated. Generally, I prefer MOSFET circuits, but bipolar devices are less expensive. Indicator LEDs are included in the interface diagrams. Because component selection must be based on the requirements of the external devices, no type designation have been specified for the semiconductors. General purpose types, such as 2N3904, 2N3906, TIP31, VN10KN, IRF511 are generally acceptable. The interface circuits may need slight modification depending on the requirements of your external devises. Other interface configurations are also possible.

The circuit in Figure 8 can be used to control power to the Elktronics ID board.

The sequencer can be controlled by your camera pause line by using the circuit in Figure 9. For more information on the use of the camera pause line for control, see the article "Control of an ATV Transmitter by Using the Video Camera Pause Line" in the Fall 1992 issue of ATVQ

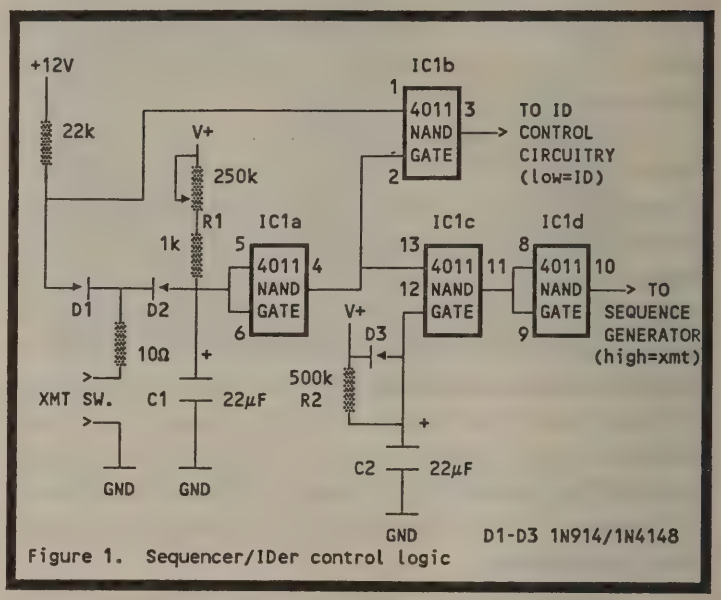


Figure 1. Sequencer/IDer control logic

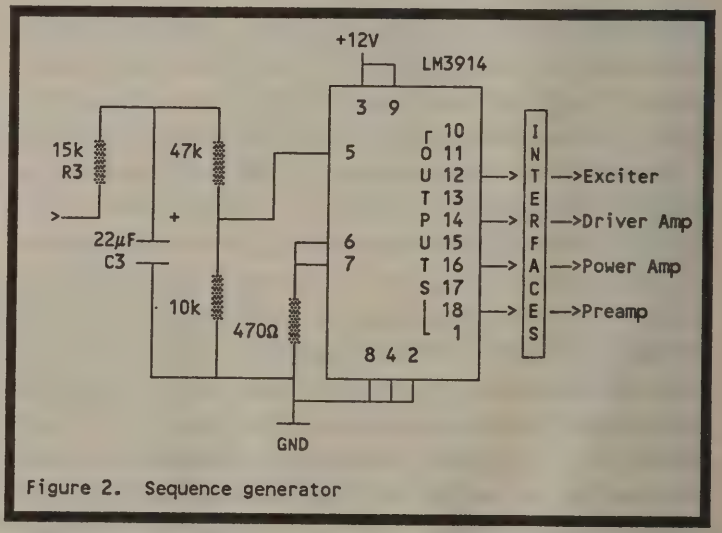
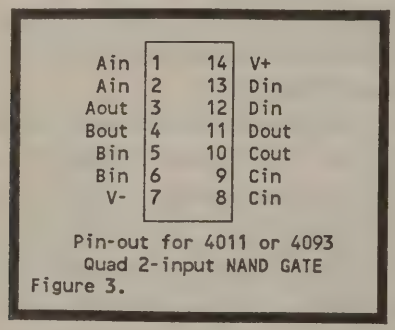


Figure 2. Sequence generator



Pin-out for 4011 or 4093
Quad 2-input NAND GATE
Figure 3.

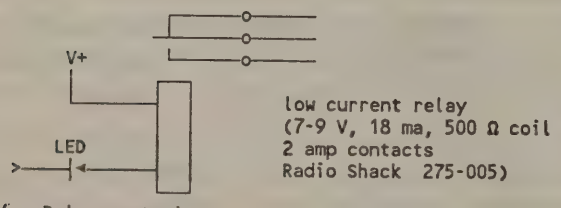


Figure 4. Relay control

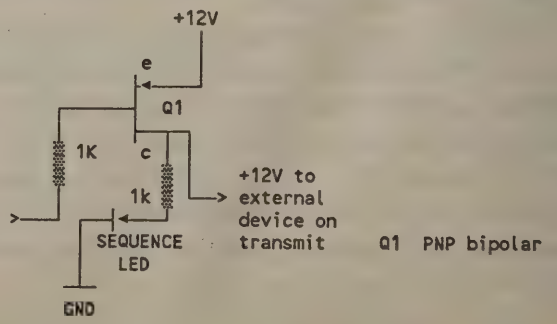


Figure 5. Exciter and driver-amp control

# A TRANSMIT/RECEIVE SEQUENCER FOR ATV OPERATIONS

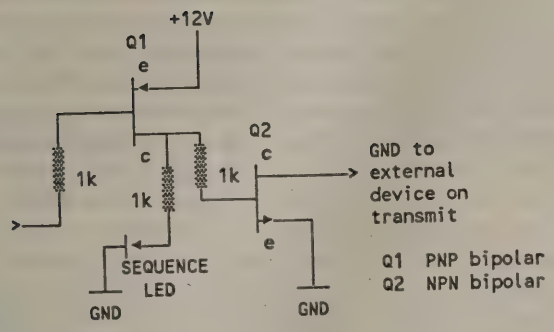



Figure 6. Power-amp control

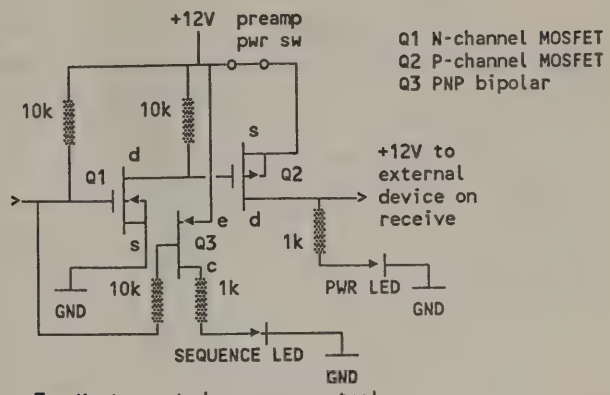



Figure 7. Mast-mounted pre-amp control

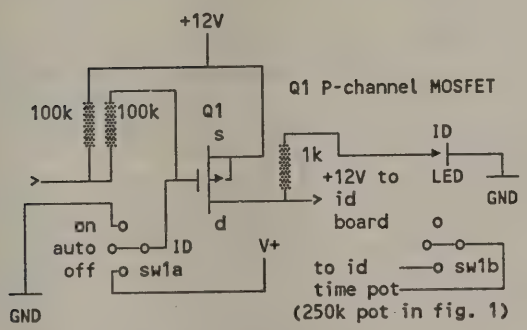



Figure 8. Power control to ID generator board

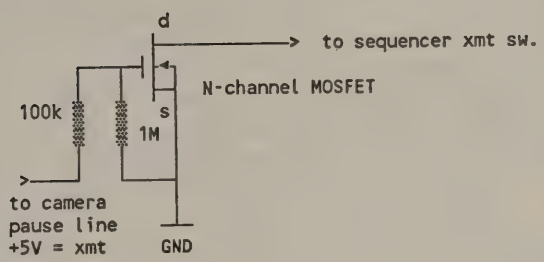



Figure 9. Camera control interface

# CQ VIDEO WINS SILVER HUGO AWARD

(Hicksville, NY) -- "Getting Started in VHF," the CQ video introduction to operating on ham radio's VHF frequency bands, has won a Silver Hugo Award from "INTERCOM '94," the International Communication Film and Video Festival. The program was honored in the competition's "Educational - Adult Audience" category.

"Hugos are awarded only to outstanding productions of incomparable excellence, creativity and originality," according to festival organizers. And festival director Michael J. Kutza notes that "there was a substantial increase in the number of entries this year and competition was more intense than ever." This was INTERCOM's 30th annual film and video competition.

"Getting Started in VHF" is intended both for new hams and for more experience amateurs who are trying VHF and UHF ham bands and a "tour book" of activities that they'll find there. It includes major segments on choosing and using VHF radios, repeater operating practices and packet radio basics, plus a look at some of the less-common activities available on VHF and UHF, such as satellite communications, moonbounce and amateur television.

The program was written, produced and directed by Richard S. Moseson, NW2L, Executive Producer of the CQ Video Library. It was narrated by Jeff Ronner, WB2AEQ, and Sharon Krossel, N2HGR, and featured animation by Howard Better. Gordon Ovsiew was the editor and Mark Abney designed to computer graphics. The work of several professional camera crews appears in the program.

"Getting Started in VHF" is the second CQ video to win a major award. Earlier this year, "Ham Radio Horizons," a basic introduction to ham radio, was presented with a bronze CINDY award from the Association of Visual Communicators, and it was a finalist in the International Television Associations's (ITVA) New Jersey Awards competition. Plus, "Getting Started in DXing" was a finalist in the ITVA'a international Golden Reel Awards competition in 1993.

The CQ Video Library is a collection of video "how to" programs about different aspects of amateur radio. Each program runs between 45 and 55 minutes and sell for $19.95. Programs are available in both the U.S. (NTSC) and European (PAL) video standards, on VHS only, and may be order directly from CQ at 1-800-853-9797.

# SO YOU WANT TO BUILD AN ATV REPEATER PART 3

*Ed. Comment: Mike has built seven ATV repeaters which link together all of southern california and parts of Nevada and expanding into Arizona and Utah, known as ATN.*

Mike, WA6SVT

In past articles we covered sites, controllers and receivers. This article will explore transmitters, translators and boosters. Let's start with Transmitters of the AM mode. The most common is the double sideband transmitter with subcarrier audio. Double sideband occupies about 9.1 MHz of spectrum (U.S. standards video with audio at 4.5 MHz), some of its attractiveness is low cost and simple construction.

The block layout of this transmitter type is usually a crystal controlled oscillator although phase lock loop has also been used. In the case of the crystal oscillator type frequency multipliers are used. The final amplifier and with some brands the driver and final amplifier is AM modulated with the video and subcarrier audio (25 KHz deviation FM) at 4.5 MHz. Most of these transmitters have a sync booster or stretcher to help compensate for the non linear curve of most ham linear amplifiers. Subcarrier audio, although reliable and inexpensive, does have its draw backs: (1) Audio carrier power is much lower than broadcasters use and (2) a little herringbone is created by the mix of the 4.5 MHz carrier and color subcarrier at 3.57 MHz. Some ATVers and repeater designers have turned off the 4.5 MHz subcarrier and added a separate sound transmitter 4.5 MHz above the video transmitter. ATN's Santiago peak repeater used this for most of its life until we used a cable TV modulator. With separate sound the video and audio transmitter must be held stable at 4.5 MHz separation + or - a few KHz or distortion would result in the audio. The separate transmitter can be separate all the way with a separate antenna or combined with a filterplexer (common on older TV broadcast transmitters) or ran through a directional coupler-circulator system as is done pm some low power TV transmitters.

Many of the new TV broadcast transmitters and low power television and all cable television systems now use IF modulators and most have built in up converters to provide a VSB (6 MHz bandwidth) television signal with the provision for composite signal or separate audio and video carrier outputs. The price of these units for cable TV and master antenna TV have improved with SAW filtering and even frequency agility on some models. Most have outputs at 55 to 60 dBmv (about 10 to 17 milliwatts) to properly match the output when using a 50 ohm load, a 25 to 27 ohm resistor in series works great at about 1 db of loss. OK for you purest out there, you can build a balun matching section. Audio deviation adjustment and on some models metering or over deviation lights are provided, some even have stereo and SAP. Video is also metered or overmod lights are provided. I suggest setting this level at 12 dB below the video carrier due to an aural carrier ratio level is provided. I suggest setting this level at 12 dB below the video carrier due to the not so perfect linear response of amplifiers available to the ham pocket book. Broadcasters normally use a - 10 dB setting and Cable and Wireless cable transmitters use - 15 to -17 dB to prevent the lower adjacent channel aural carrier form causing cross hatch interference to the video picture.

For use on 70 CM band, the hyper band cable channels 57, 58, 59 and 60 will work as is and most have offset switches to fine tune to any .25 MHz step needed on the frequency agile units. For 33 CM band and up, use a good stable oscillator and a double balanced mixer followed by a small amplifier and bandpass filter to get up to frequency or a very linear transverter. The video may need to be ran through a pre-amp to slightly boost the sync before feeding it to the modulator. I designed one some time ago and Bill Brown of Elktronics has both boards and completed boards. The key to making any ATV transmitters picture have the least distortion (sync compression and to a lesser degree, burst and black compression) is to drive the driver and power amplifiers following the transmitter at half of it saturated power. I am not talking about average power but peak sync power. If in doubt, look at the output demodulator receiver or diode detector sampling a tiny portion of the output power going to the antenna. Set the proc-amp to no sync boost or take out the proc-amp. Now, with a proper NTSC signal, preferably from a color bar generator, advance the drive until you start to see the sync compress. This is the best setting for quality, but is at about 30 percent power with most ham amplifiers of good quality. To get some more output power, advance the RF drive to the point that the sync compresses by 25% (from 40 units to 30 units). Now activate the proc-amp and advance the sync control to get 40 units or normal sync back. This will normally give you 60 watts for a 100 watt rated amplifier at sync pulse time. The watt meter will read somewhere at half the peak power for a color bar and all over the place on various pictures.

I know most of you like to peak all the adjustments for maximum output, but please try to resist temptation as you will only slightly get more peak power and have much more indicated average power. Remember in television the dynamic range is about 18 dB from white to sync tip in a properly modulated transmitter.

Some more helpful hints on power amplifiers. Many amplifiers need about 1000 uf of filtering for every amp of current used. This will help reduce sync compression due to resistance in the DC power leads. One way to confirm this is to look at the vertical sync rate on a scope hooked to the DC power lead entering the amplifier, be sure to have the AC mode selected. You should see only a few millivolts of vertical sync present. For the low power stages following the cable modulator of up converter various MMIC's works great, some now are rated for 100 milliwatts output class A. There are a few of the class AB1 power bricks out that work very well to develop power.

## TRANSLATORS

Simply put, a translator takes one TV channel and filters, amplifies, then converts to IF that is further filtered and is amplified with AGC control, then upconverted to the desired channel and fed to an output driver amplifier. A unit called a TV channel processor will work well for ATV repeater translator. They are available as is the TV modulator from CATV supply houses for a few hundred dollars. Most translators are now frequency agile and the RF output stage is the same as the in CATV modulators as to frequencies and levels. Use the same type of power amplifier setup as I discussed earlier in the article, but set the drive to the point of sync compression. Sorry, proc-amps do not work at RF frequencies, so expect lower out put power. As will all ATV transmitters, DSB or VSB, an output VSB filter is recommended for the following reasons: (1) Even with the CATV VSB filtered output, some lower side band reinsertion will occur depending on the drive level to the output amplifiers unless you use ultra linear class A amplifiers. (2) When most of you install your transmitter antenna at a site, several other very closely spaced antennas will be next to yours and signals from their antennas will send several milliwatts of power into your antenna and this will mix in

your final amplifier and cause a lost of undesired QRM to your neighbor on the hill or building site. I also recommend a circulator to also reduce this effect and absorb most reflected power from a damaged antenna (at most sites it will happen at least once very few years). A bonus is most of the lower side band energy reflected (at most sites it will happen at least once every few years). A bonus is most of the lower side band energy reflected by the VSB filter will be absorbed.

For receive frequencies above 70 CM, use a good crystal or PLL down converter to feed the channel processor. Also add to your repeater's ID screen the necessary information about the translator and site location. The translator will be the cheapest way to greatly extend your coverage area, to get the signals back, another translator or a second receiver on the repeater input frequency can be installed at the translator site and microwave it back to the repeater site.

## BOOSTERS

A booster is an amplified version of the passive repeater. A directional antenna is aimed toward the repeater and is fed to a filter and amplifier. The signal is then fed to a cardioid or directional antenna to fill in dead spots in the coverage area. You can run as much gain as you like up to 10 dB below antenna to fill in dead spots in the coverage area. You can run as much gain as you like up to 10 dB below the antenna to antenna isolation factor to prevent oscillation. Also try to use cross polarization at the site between the receive antenna and the transmit antenna. This will improve isolation and minimize ghosting at receive sites in the transition zones between the direct and boosted coverage zones. The amplifier should be AGC controlled and well filtered for your channel only. This system has the advantage to save spectrum, but needs good antenna to antenna isolation. A typical example would be to fill a shadow caused by a hill to the main coverage of a repeater. Another booster on the input to the repeater can be put into service to go back or add a second receiver on the input frequency and microwave it back to the main repeater site. The CATV channel processor will work well for the core of the booster provided that the same oscillator is used to provide zero translation error or suffer a heterodyne in parts of the coverage area.

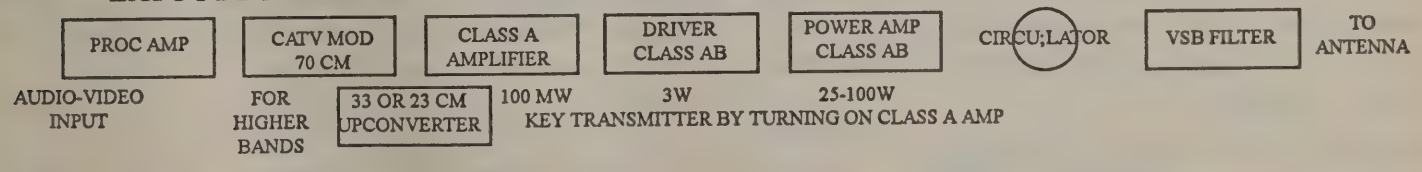
## FM TRANSMITTERS

The most common type of FMTV transmitter uses a PLL that is frequency modulated by both video and up to 4 subcarriers. (Because of the capture effect of FM, the normal herring bone pattern caused by the color subcarrier and audio subcarrier is not viewable in the picture.) The deviation of the video is normally 4 MHz plus the audio subcarrier deviation of the video carrier normally set to 400 KHz per subcarrier. Commercial TV uses 75 KHz audio deviation, but most hams are using existing subcarrier boards used for AM TV at 25 KHz deviation, so I guess the defacto value for ham FMTV is 25 KHz for the audio subcarrier. The other type of FMTV transmitter uses an IF modulator that is then hetrodyned to the desired frequency. Most common subcarrier frequencies are 4.5, 4.83, 5, 5.5, 5.8, 6, 6.2, 6.5 and 6.8 MHz for the 23 CM band. I would refrain from use of frequencies above 5.8 MHz due to bandwidth limitations on this band (12 MHz wide) and no more than two subcarriers for FMTV transmitters installed at the repeater site for link or as the repeater output a channel filter is needed to keep the non-significant side bands from causing QRM to other 23 CM users on the site and for all the other reasons described earlier for the VSB transmitters.

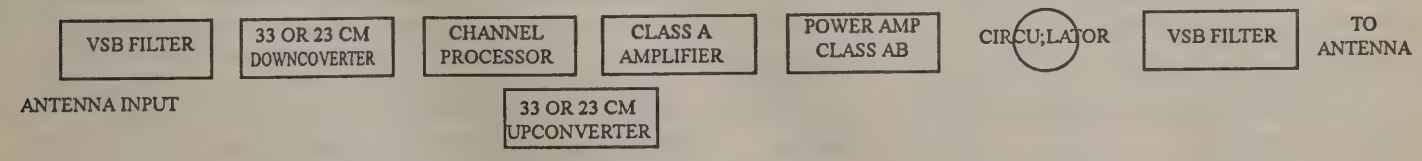
The use of pr emphases is desirable to enhance the signal to noise ratio at the receive end of the link. Ham FM TV uses the same CCIR pre-emphases curve as broadcasters and other microwave TV users use. Power amplifiers need not be linear, the use of efficient class C at, or near, saturation is normally used, but any of the class AB1 power bricks or class C bricks work well. Remember to use extra cooling as this is 100% duty cycle and the amplifier is run at full power as compared to the VSB amplifier is a good choice. In some cases, you might have to run 3.5 MHz deviation of the video carrier and 4.5 MHz and a tight channel filter to keep in the crowded 23 CM band. (A like channel filter at the receive end of the link would be of use with the reduced deviation link as well as a 12 MHz wide IF filter installed in the receiver.)

Our next and last article will deal with antenna systems, feedlines grounding, and antenna placement on the tower at repeater sites. 73's and keep the phosphors glowing and your ATVQ subscription current.

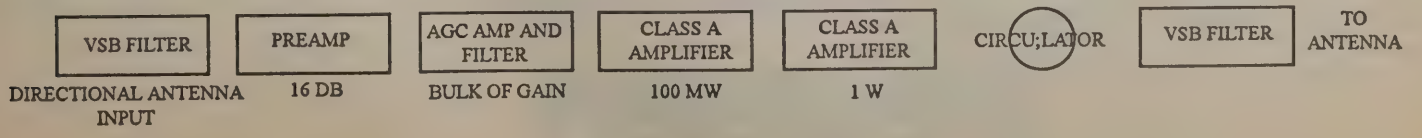
LAYOUT FOR A VSB REPEATER TRANSMITTER




TRANSLATOR: FOR 70 CM INPUT DELETE THE DOWNCONVERTER

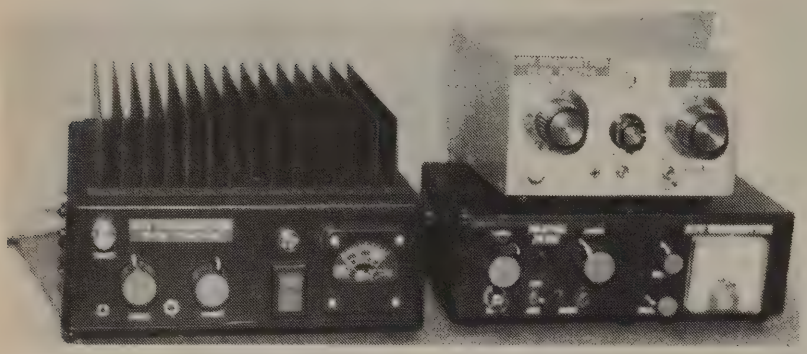



BOOSTER: FOR FM SUBSTITUTE CHANNEL FILTERS A CHANNEL PROCESSOR WILL WORK FOR THE AGC AMP



# ATV TRANSMITTERS & TRANSCEIVERS

| | | |
|---|---|---|
| 70 Cm. AM VIDEO 10W P.E.P..... | $293.00 1 XTAL | **PD-ATV-5** |
| 70 Cm AM VIDEO 55W P.E.P..... | 530.00 1 XTAL | **PD-ATV-50** |
| 70 Cm AM VIDEO 10W P.E.P. with a 1 XTAL, T/R switched DOWN CONVERTER..... | 379.00 | **PD-ATV-4** |



**900 & 1200 Mhz. Transmitters**
AM & FM ATV
Outputs vary - depends on model
***New!***
Call or write for info.

## DUPLEXERS
2 Mtrs. - 70 Cm.
LOW LOSS TYPE
0.2db. 2 meters - 0.5db. 70 Cm.

**PD-144E -** (2 Mtrs.) Diecast "BNC" or "SO239"
Nf 0.6db. gain 17-18db..... $47.00

**PD-144TR -** (2 Mtrs.) Diecast "BNC" or "SO239"
T/R switched 75W "THRU"..... 99.00

**PD-144-TR-L** (2 Mtrs.) Diecast "SO239"
TOWER MOUNT INC. BRACKET & "U" BOLT.
SPECS: T/R type Nf 0.7db. GAIN 15-16 db.
Separate F/T for Voltage..... 123.00
Voltage feed "THRU" Coax Cable..... 135.00

**PD-440-S -** (420-450 Mhz.) Diecast "BNC" or "N" connectors..... 56.00
Nf 0.5db. Gain=16db.

**PD-440TR -** "N" Connectors only, DIECAST 75W "THRU"
Nf 0.6db. Gain 15-16Db..... 99.00
SAME EXCEPT 20W "THRU"..... 79.00

**PD-900 -** (900 Mhz.) Diecast "N" Conn.
Nf 0.6db. gain 15db..... 85.00

**PD-900TR -** (900 Mhz.) Diecast "N" Conn.
Nf 0.7db. gain 14db. Max "THRU" 20W..... 139.00

**PD-1200 -** (1.2 Ghz.) Diecast "N" Conn.
Nf 0.5Db gain 15db.. TUNED INPUT & OUTPUT..... 85.00

**TPD-1200 -** Nf 0.38db. gain 16db. Diecast "N" Conn..... 90.00

**PD-1200TR -** (1.2 Mhz.) Diecast "N" Conn
"THRU" Max 20W Nf 0.7db. gain 15db..... 139.00

**PD-2300 -** Preamps Nf 0.9db. gain 16db.
TUNED INPUT & OUTPUT. Leads only..... 79.00

**VIDEO LINE SAMPLERS -** ..... 70.00 & 95.00

**Power Modules on P.C. boards inquire**..... 35.00 - 150.00

## PREAMPLIFIERS
All kinds from 2-30 mhz.
to 2.3 ghz., some T/R
(inquire about our 1.2 ghz. type).

## Tower Mounted diecast 125W Capacity
**Designed for Packet FM-SSB-ATV**

100 misecs. and 1½ sec. switching.
Magnacraft relays and diode protection.
SINGLE GATE GaAs Fet. transistor.
NF 0.6db. G 16db.
PD-440TR-L (420-450 Mhz.)..... $123.00
Same - Isolator ..... 135.00

## TOWER MOUNTED DIECAST
75W capacity. Fast switching.
Special switching and diode protection.
SINGLE GATE GaAs Fet. transistor.
NF 0.6db. G 13-17db.
TPD-900-TR-L (900 Mhz.)..... 179.00
TPD-1200-TR-L (1.2 Ghz.)..... 179.00

*Call or write for 18 page cataloge.*

paudon ASSOCIATES

210 Utica Street Tonawanda, NY 14150 (716) 692-5451

# *the new digital satellite tv systems*

## INTRODUCING DSS™

**Soon you'll wonder how you ever lived without it!**

*Now you can get what you are looking for—Convenience, Value, Choice —right in our living room.*
*More Hollywood movies. More sports action. More news and information. More comedy shows. More special events than ever before.*

### USSB

Only from USSB. The biggest hits on the smallest dish™.

USSB gives you laser disc quality access to America's favorite networks. Like Showtime and HBO, which offer the best films from Hollywood and diverse, original programming; the classic and contemporary films on Cinemax, non-stop movies on The Movie Channel and movies from the '60s '70s and '80s on FLIX. You'll also get great music videos on MTV and VH-1, unique comedy on Comedy Central, quality children's programs on Nickelodeon, and classic television on Nick at Night. As well as quality women's programs on Lifetime and the 24-hour-a-day fast-paced All News Channel. In other words, entertainment for the whole family!

And unlike most of America, you don't get only one channel of each premium network. Thanks to new multichannel technology you get five distinct channels of HBO, three channels of Showtime, two channels of The Movie Channel, three channels of Cinemax and FLIX. Fourteen premium networks and six hand-picked basic services for a total of twenty distinct choices every time you sit down to watch TV.

You'll be amazed at the value and variety of packages available from USSB; from a mere $7.95 to just $34.95. And your first month is complimentary, so you can enjoy the entire USSB line up on us.

By combining the best premium programming with the best picture and sound in the history of broadcasting, USSB takes the television viewing experience to a new level. To subscribe, call 1-800-204-USSB today. **RCA...Sharper picture. Clearer sound. Greater choice.**

## DSS Features:

**18" Satellite Dish**
**Satellite Receiver/Decoder**
**Remote Control**

Introducing the RCA brand DSS™ (Digital Satellite System)...the ultimate digital entertainment experience. The advanced digital compression technology delivers broadcast pictures with laser disc precision accuracy and CD-quality sound clarity. All from a small 18" dish that can be easily installed on your home or property.

And when combined with an RCA Home Theater™ Television, the DSS raises home entertainment excitement to new levels. What's more, the system is capable of delivering the 16 x 9 widescreen pictures today, and the high-definition TV images of tomorrow.

RCA Brand DSS. The future of television today...and beyond!

## DIRECTV

DIRECTV™ offers more personalized TV choices than any other entertainment programming service! Monthly programming packages deliver not only the best names in cable entertainment, but allow you to customize your TV viewing with available "a la carte" and pay per view selections to suit your personal taste. Sports fans will enjoy tons of professional and collegiate sporting events—you'll never have to settle for only the network game again.

DIRECTV also brings you Direct Ticket™ Pay Per View. Choose from up to 40 channels of Hollywood movies, sports and special events, with box office hits long before they appear on the cable movie channels—with starting times as often as every 30 minutes. Direct Ticket brings video store convenience right into your living room—what you want, when you want it! Plus DIRECTV offers you 30 commercial-free CD-quality audio music channels. DIRECTV—your only source for up to 150 channels of information and entertainment! To subscribe, call 1-800-DIRECTV.

## DSS BRINGS THE DIGITAL REVOLUTION INTO YOUR HOME.

There's nothing even remotely like it! The RCA-brand DSS delivers all-digital picture and sound quality you have to see to believe. And its exclusive on-screen program guide and many convenient features make the DSS your best choice for the most satisfying TV viewing experience you can have today.

Through the advanced DSS technology, DIRECTV and USSB offer you an amazing variety of programming choices and deliver video store convenience direct to your living room!

The DSS gives you the best TV entertainment value at the most affordable price.

Use the DSS remote control and on-screen program guide to select programming, create "favorite" channel lists, and request information on programming specials all at the touch of a button.

The DSS gives you complete parental control over pay per view spending limits and program selection.

SHE'D BEEN TAILIN' ME FOR 5 BLOCKS --- I DIDN'T KNOW WHY 'TIL SHE STOPPED ME AND HIT ME WITH THE SCRUB BOARD!

# BRATS VS-100 ATV CONTROLLER INTERFACE PROJECT

Mike Dees, N3EZD

The Baltimore Radio Amateur Television Society (BRATS) operates the second oldest ATV repeater (W3WCQ/R) in the country. The BRATS ATV repeater has been on the air since 1977. The BRATS 439.25/911.25 MHz output ATV repeater is located in northeast Baltimore, Maryland, and hosts an ATV net on Thursday nights at 9:00 p.m. with audio on the 147.03+ MHz repeater. If you are in the area, drop by and check in, all are welcome.

The system has gone through many modifications and changes over the years. As part of a current expansion of the repeater, the technical committee decided that the existing custom built repeater controller would not be able to handle the planned expansion.

We decided to purchase a VS-100 ATV controller (manufactured by Micro Computer Concepts, 8849 Gum Tree Avenue, New Port Richey, FL 34653, 813-376-6575) in order to accommodate the planned expansion of the BRATS ATV repeater system. The BRATS new system was designed to provide three-band receive and transmit capability as well as to allow video input from other sources for special purposes.

The VS-100 ATV controller provides 10 video inputs, four audio inputs, remote control and configuration by DTMF tones, and can be configured for several operational modes including a repeater.

To retain our current controller capabilities, an auxiliary controller was constructed for use with the new VS-100 controller to provide the following functions and capabilities.

Remote and local control to enable/disable each transmitter and also provide indicators for the status of the transmitters.

A user-activated one-minute beacon and an automatic daily 15-minute beacon function that can be overridden by any ATV repeater user by simply transmitting into the system. A local beacon control switch and beacon active indicator were also included.

A four output video distribution amplifier.

A speech recognition audio squelch gate to provide squelched audio to the audio distribution amplifier. Local control of the audio gate is provided as well an indication of when the audio gate is open.

Separate Elktronics video ID boards were installed in the main controller and in the auxiliary controller. The ID boards were modified to provide eight ID screens instead of the usual four; a further modification can be preformed to allow 16 screens from each board. The main controller ID screens may be selected in groups of two, or all 8 screens can be selected to rotate; the main controller ID screens are displayed for approximately one second the end of a users transmission. In the auxiliary controller, 8 screens rotate (7 seconds each) during the daily 15 minute beacon and during a user activated beacon. We use two of the four hi-res screens to provide text information about the club, ATV net, and the ATV repeater inputs/outputs.

The construction of the new control system was a joint project by several club members. The various tasks were completed by:

**W3WCQ**
designed and built the video distribution amplifier, and built the audio squelch board from an article in the November 1992 issue of QST (page 54).

**N3IDV**
designed and built the DTMF decoder and timer circuitry to provide a user activated one minute beacon control signal, and helped design and then built the beacon control interface circuit.

**N3HAT**
built the transmitter control board, located and purchased an enclosure matching the one used for the VS-100, and labeled the front and back panels of the VS-100 and the auxiliary controller.

**WB3DVL**
machined the enclosure for the auxiliary controller and mounted all of the controls, indicators and circuit boards.

**W3WVV**
designed and built the existing audio distribution amplifier.

**N3EZD**
was project manager for integration of the subassemblies, designed the beacon control interface circuit and the transmitter control circuit, modified the Elktronics ID boards to provide eight screens and burned new EPROMs, interconnected all boards in the auxiliary controller, installed the Elktronics ID board in the VS-100, added a PTT indicator to the VS-100, converted the VS-100 remote control outputs to open drain, and programmed the system.

To facilitate the use of the VS-100 in our system, we found that we needed the ability to control several parameters that were fixed in the then current firmware. I contacted Ron Wright at Micro Computer Concepts and explained the situation. Ron was very helpful and wrote new routines to allow certain timers and parameters to be programmable. He shipped the revised firmware to us in only a few weeks. The new version 2.10 firmware allows:

1. the length of time the controller looks at each input before moving on the next,
2. the length of time that sync must be detected before being acted on,
3. the selection of the number of inputs to be scanned in the repeater scan mode,
4. the length of time the video ID is displayed at the end of a user's transmission in the repeater mode, and
5. the length of time after a user's input signal disappears before the video ID is displayed.

Having the ability to adjust these parameters has allowed us to fine tune the controller for smooth operation. The VS-100 controller is a fine piece of equipment and the technical support of the product is excellent.

Several drawings of the ATV system and subsystems follow. Figure 1 shows a block diagram of the ATV system as designed. Note that the 400 receiver and transmitter, the 900 transmitter, and the 1200 receiver are located at a single site and are currently operational. The 900 receiver and the 1200 transmitter are under construction and will be located at a separate site. The linking of the two sites has been omitted for clarity.

Figure 2 shows the placement for the individual boards in the auxiliary controller.

Figure 3 shows the beacon control schematic.

Figure 4 shows the transmitter control schematic.

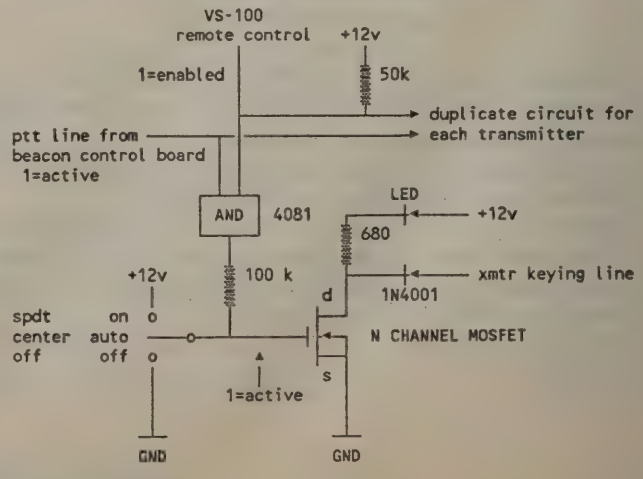



Figure 4. Transmitter Control Interface
(the schematic shown is for remote control of one transmitter, and must be duplicated for each transmitter to be controlled)

# BRATS VS-100 ATV CONTROLLER INTERFACE PROJECT

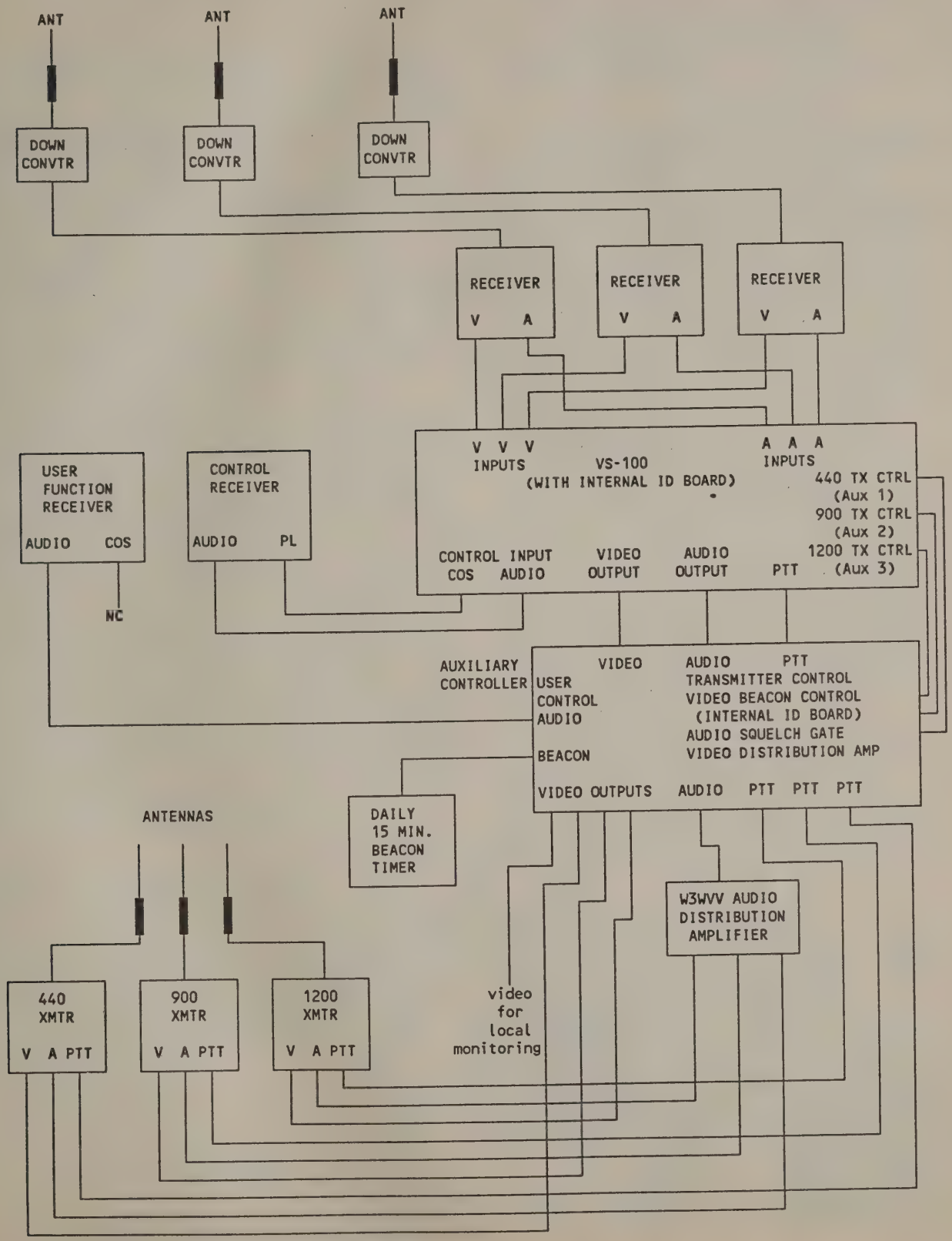
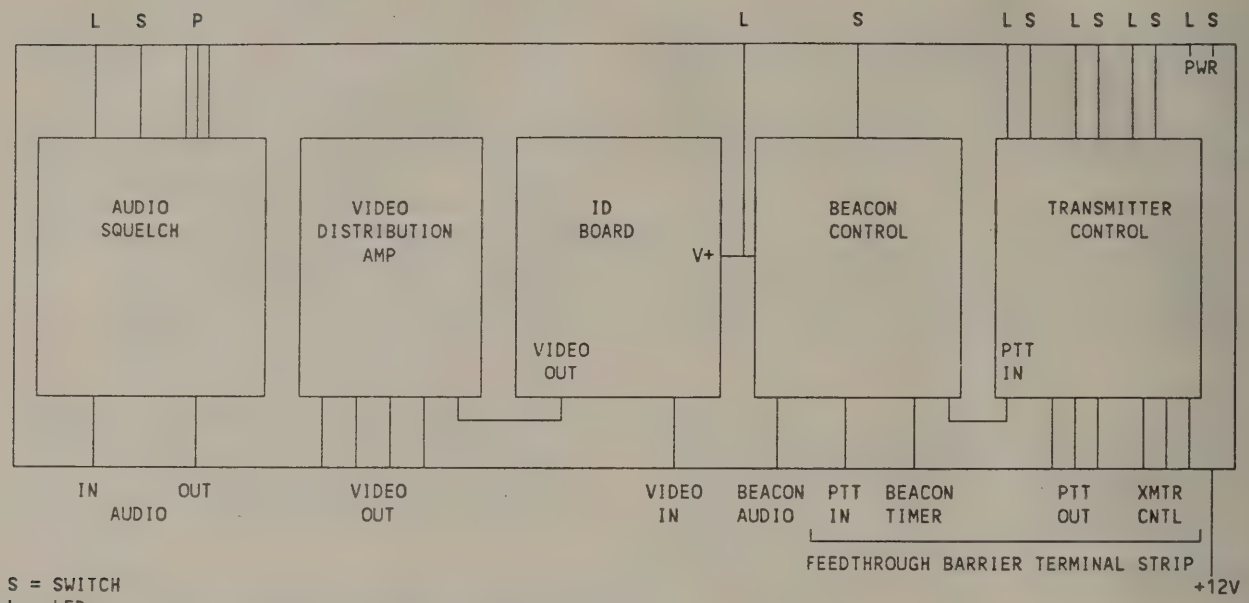


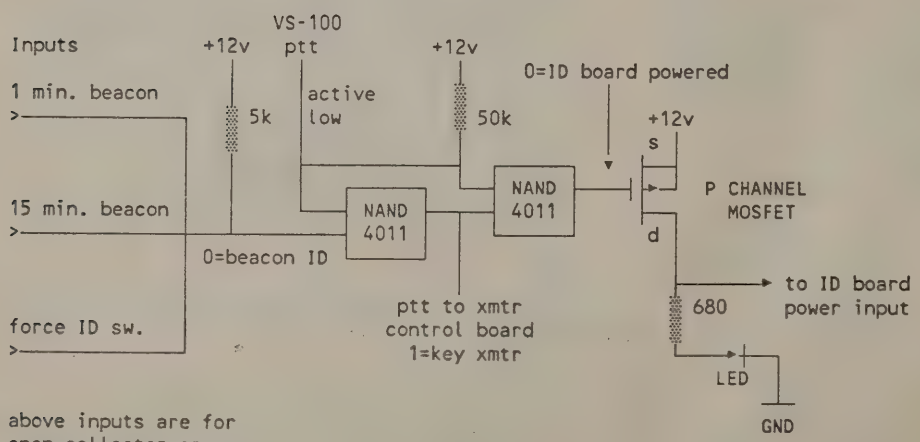

Figure 1. BRATS repeater system block diagram

# BRATS VS-100 ATV CONTROLLER INTERFACE PROJECT




S = SWITCH
L = LED
P = POTENTIOMETER
VIDEO CONNECTORS - BNC
AUDIO CONNECTORS - RCA PHONO

Figure 2. Auxiliary controller unit




above inputs are for open collector or dry contact to ground

Figure 3. Beacon Control Interface
This circuit allows users to override the daily or user activated beacon ID.

# OLD THRESHER'S REUNION

**Dave Schneider, WOENR**

The Mt. Pleasant Amateur Radio Club was active at the 45th annual Midwest Old Thresher's Reunion 1-5 September. This is an event that showcases over 100 operating steam engines, antique cars and trucks, electric trolleys and steam trains, agricultural and theater museums and Iowa's largest working craft show.

A small building owned by the local ham radio club, is located on the Old Thresher grounds in this southeast Iowa community of Mt. Pleasant. There, the club members and some visiting operators ran station WMME on HF, V/UHF, and an amateur television demonstration, plus answering visitor's questions.

A guest book was kept at the ham shack and 189 Amateur Radio operators from 18 states signed in. There were 64 messages originated from the club station from visitors to points across North America. Fred Haberer, NVXY, designed a pamphlet about the hobby and the club, which was made available to those interested.

When time permitted, WMME was run as a special event station with 222 contacts logged. Local repeaters on 147.39 and 444.95 MHz were monitored for attending operators to get information.

A parade held in Mt. Pleasant's business district was televised live by Gary McMeins, NFIB, and sent back to the ham shack a mile away for those there to watch.

One session each of the Midwest Country Cousins Net, on 3972.5 kHz, and the Iowa Net, on 3970 kHz, was called from WMME by club members who normally handle that duty from their home stations.

Local hams also watched over the handicap parking and assisted the group providing security. Plans for next year include more use of amateur TV, plus powering the radio equipment with a steam engine.

Those who helped operate WMME during Old Thresher's this year were Neil Johnson, NSFH, Gary LaForce, NPBM, Paul Collinson, WB9ATU, Jeff Nichols, NIJM, Gary McMeins, N9FIB, Ruth Ann McMeins, NVXZ, Dave Ruby, KAFBL, Bill Barber, NOJ, Russ Ralphs, WA6GUF, Seth Ralphs, NWCZ, Kent Lee, NVIR, Gene Boese, NWDB, Roy Lewis, WAKLD, Julie Schneider, KAUCN, Dave Schneider WDENR, Don Schneider, WDENR, and Spence Gray, NXJU.

# A NEW FCC SERVICE

The FCC has instituted a toll-free phone line at its Gettysburg, Pennsylvania licensing division for customer service inquiries. Amateurs may call 800-322-1117 weekdays between 8:00 a.m. and 4:30 p.m. Eastern Time to access an automated information system with recorded messages on interference complaints, form requests, records, and Amateur Radio call sign assignments.

Other messages regard fee information and processing times. A TouchTone telephone is required.

The FCC said the new service was part of its response to a presidential order that the federal government be "customer driven." The FCC said it used a series of focus groups with external customers to identify the desire for an 800 number at its licensing division.

"Within the next 18 months," the FCC said, "customer service standards will be developed for other areas of Commission operations to ensure that FCC customers receive the highest quality of service possible. As these new standards become available, the FCC will inform its customers."

# NEAR OUTER SPACE TRANSPORTATION SYSTEM (NOSTS-1)

## BALLOON LAUNCH - CLEAR LAKE AMATEUR RADIO CLUB

Sunday, October 9, 1994, the Clear Lake Amateur Radio Club announces the maiden flight of the Near Outer Space Transportation System utilizing a 12 foot diameter helium balloon as the launch vehicle. NOSTS-1 is an amateur radio experiment which will carry a various payload in a package weighing less than 6 pounds. All interested hams are invited to participate. The payload consists of: 2 meter packet on 145.75 MHz simplex - the node name for digipeating is NOSTS-1, the mailbox callsign is KJ5MX-6, the beacon IDs as KJ5MX-3

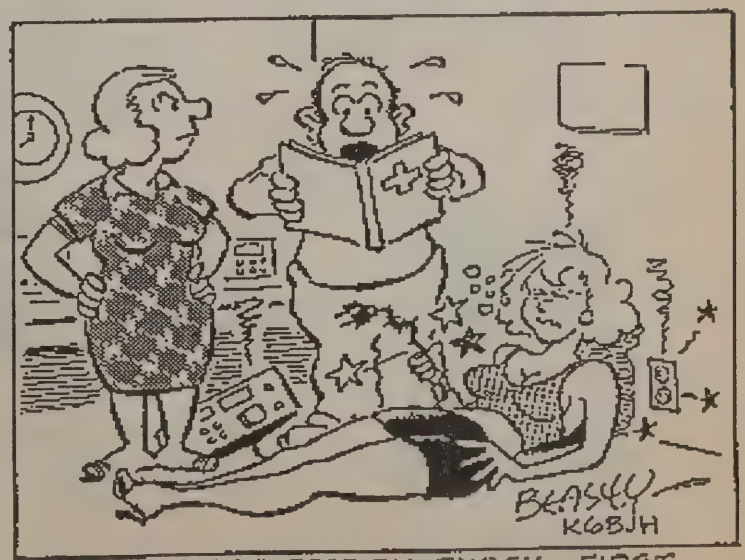
. Beacon on 29.420 MHz sending "CW" beeps that correspond directly to the outside temperature. At 70 degrees Fahrenheit, the beep rate is approximately 200/min. To calculate temperature from beep rate, the formula: Temp (degrees F) = [0.56853 X {Beep rate}] - 38. The antenna for this device is a 2 meter dipole cut to enhance the 5th harmonic at 147.10 MHz for direction finding purposes.

. Beacon on 224.72 MHz for direction finding purposes only.

. Potential secondary payloads may include a 10 GHz gigaplexer beacon and Final announcements on these payloads will be made on launch day.

The Clear Lake Amateur Club Balloon Launch Team wishes to thank Andy MacAllister, WA5ZIB, and members of the South Texas Balloon Launch Team for assistance, advice, and use of 220 MHz beacon, 29.420 MHz fireball. An informal simultaneous HF (7.155 MHz or up for QRM) and UHF (442.750 SE Houston 444.275 MHz NW Houston repeaters) net will be held at 7:00 p.m. on Saturday, October 8th, for final updates. The 40 meter net on the same frequency will be active immediately before and during the flight.

The launch site will be West of the Houston area and the direction of flight will be from west to east. Coverage may extend several states. For additional information and reception reports, contact:
Dan Feeback, KJ5MX 713- 286-0230 (H) 713-483-7189 (W)
John Maca, AB5SS 713-488-2025 (H) 713-244-7774 (W)

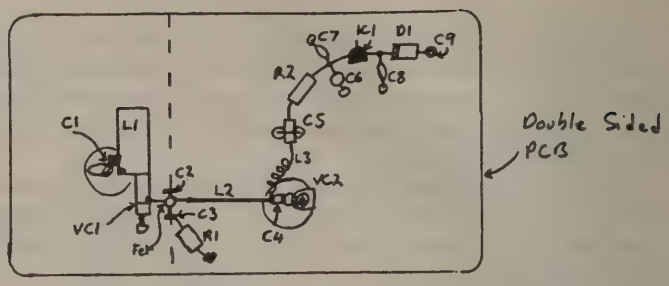



—IN CASE OF ELECTRICAL SHOCK, FIRST LOOSEN PATIENT'S CLOTHING!

# 23/24 CM PREAMPLIFIER

*from CQ-TV*

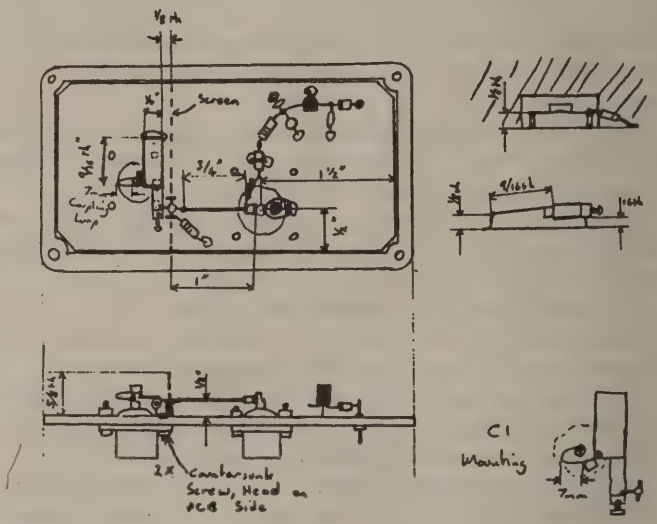
*This article was given to me at the Rally be a member who unfortunately did not include his name with the paperwork. Consequently, I am unable to credit them with the articles, but if they would like to let me know who they are, I will credit them in the next issue. Also, if the articles appear to be a little short on textual details, don't blame me - I'm only printing what I got. ... Mike.*




The circuit is as shown. Construction should follow the diagrams. There are one or two special components which must be used:

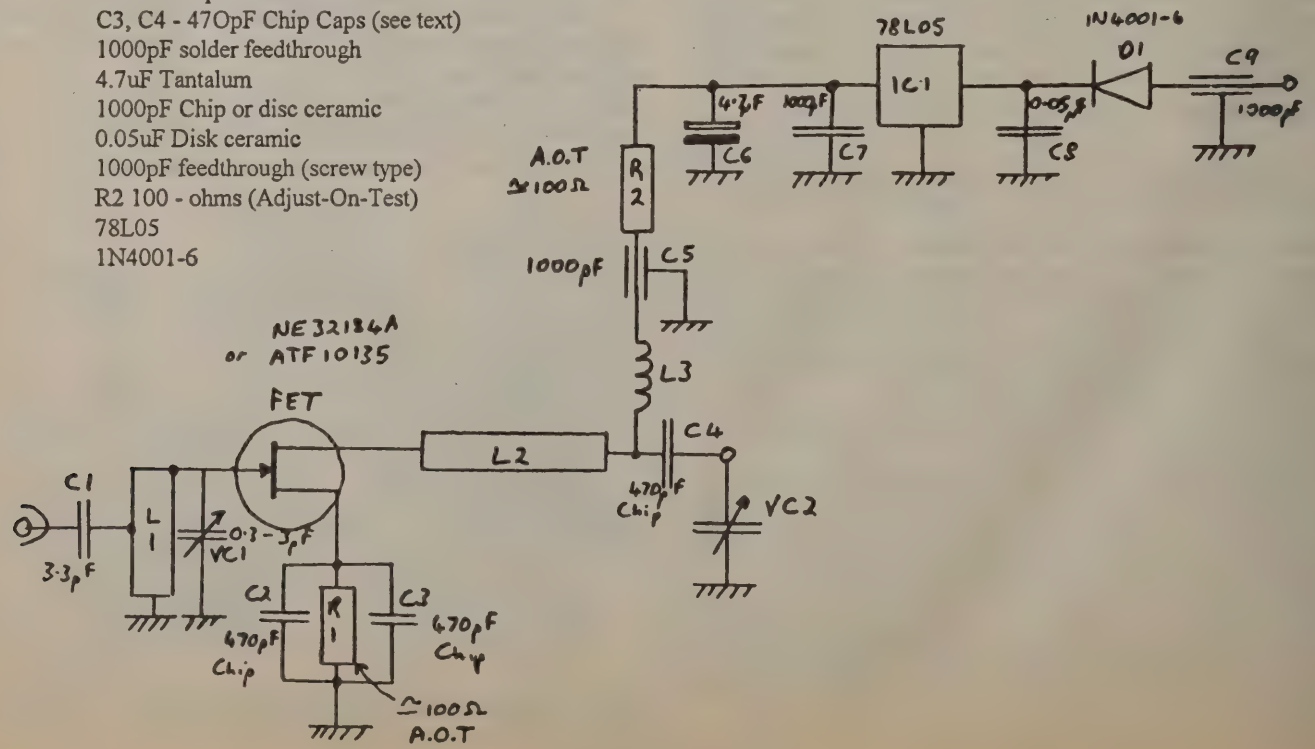
VC1 is a 0.3pF PTFE Piston Trimmer (available from Circuit or Mainline Electronics)
C2, C3 and C4 are chip capacitors (mounted vertically) 1206 format (not 0805). (Length 3.45 mm approx. 1/8") RS Components (Electromail) Pt No. 126-326.
C5 470-1000pF feedthrough capacitor
L1 Brass sheet 0.015" thick x 1/4" x 9/16" long + 1/8" bend (see diagram)
L2 3/4" long 25/26 SWG copper wire mounted 1/8" above ground plane
L3 6 turns of 25/26 SWG 1/8" i.d. close wound enamelled copper wire
C7 Preferably 1000pF chip (gives extra mechanical support) mounted vertically

When setting up, the voltage across source drain should be set for 2 to 3 volts with R2. Current (measured across R1, I=V/R) is set to 10-15mA by changing value of R1 (after adjustment, check source drain voltage again).




## Component List

| | |
|---|---|
| L1, | L2, L3 - (see text) |
| FET | ATF 10135 or NEC NE32184A |
| C1 | 3.3pF Ceramic |
| VC1 | 0.3-3pF Piston Trimmer |
| VC2 | 5mm 0.8-7pF Ceramic Trimmer |
| C2, | C3, C4 - 47OpF Chip Caps (see text) |
| C5 | 1000pF solder feedthrough |
| C6 | 4.7uF Tantalum |
| C7 | 1000pF Chip or disc ceramic |
| C8 | 0.05uF Disk ceramic |
| C9 | 1000pF feedthrough (screw type) |
| R1, | R2 100 - ohms (Adjust-On-Test) |
| IC1 | 78L05 |
| D1 | 1N4001-6 |



# WEATHER SATELLITE SYSTEMS

from

## Spectrum International, Inc.

| | |
|---|---|
| PROsat II Display Sub System: | |
| Decoder Board and Software, Model TS-VGA SAT4 | $349.00 |
| 137 MHz Receiving Sub System: | |
| Antenna, Model 2XY-137-c | $99 |
| Low Noice Pre-amplifier, Model TS-137-P.Amp. | 65.00 |
| 137 MHz scanning receiver, Model TS-137-Rcvr. | 299.00 |
| Orbit Prediction Programme, Tract II | 99.00 |
| Low Loss Coaxial Cable, 65 ft. with connectors fitted | 65.00 |
| (longer lengths at $1/ft. extra) | $627.00 |
| 1691 MHz Receiving Sub System: | |
| Loop-Yagi Antenna, Model 1691-LY(N) | $99.00 |
| Low Noise OaAs FET Pre-amplifier, Model TS 1691-HEMT | $250.00 |
| 1691 MHz Receiver, Model TS-1691-Rcvr. | 450.00 |
| Low Loss Coaxial Cable, 65 ft. with connectors fitted (longer lengths at $1/ft. extra) | 65.00 |
| | $864.00 |

The cost of a complete 137 MHz system is $976 ($349 + $627)
The cost of a complete 1691 MHz system is $1213 ($349 + $864)
The cost of the two systems together is $1840.

Demonstration Disc (IBM-PC VGA Compatible) of Signals recorded from wx-sat System are available for $3.
Shipping: FOB Concord, MA.
Prices subject to change without notice.

MasterCard

si

SPECTRUM INTERNATIONAL Inc.
Post Office Box 1084 Dept T
Concord, Mass 01742 U.S.A.
Phone 508 263 2145
FAX: 508 263 7008

VISA

# BUILD THIS 1280 MHZ CAVITY FILTER

Here is a simple single cavity filter for the 1280 Mhz band. The design is the result of a need to provide a front end tuned input for the Down East Microwave 1280 Mhz GASFET dual stage preamp. This preamp has no tuned input stage so its response is quite broad. To minimize unwanted interference from swamping and desensitizing the front end, this filter was born. Now I realize that many of you don't own a lathe that I used to construct this device so use this information to make do with what you have. For instance, a round cavity is not needed...a square one of similar dimensions made out of blank copper clad circuit board stock will also work. I used what was available...which turned out to be a piece of 2 inch diameter silver plated brass tubing that I found at a Hamfest disguised as some weird sort of RF filter. I look for items like this that can be used for these projects.

In any case, look at the input and output coupling of this design. Not very often will you find a cavity that is not link coupled on input and output. This design uses capacitive coupling to the center post provided by the end of each female "N" fitting. The spacing of about 1/16 inch seems just about right but leave room to be able to slide them in and out to obtain good coupling without reducing the Q too much. Closer provides more coupling and further away from the center post reduces coupling and raises the Q which will affect the sharpness of the bandpass. Also, and probably the most important, is that as coupling is reduced, the loss thru the cavity increases. With a little juggling a happy medium can be found where the coupling is minimized before the loss becomes noticeable. This is not a critical adjustment and "on the air" tests will be adequate but, in my opinion, nothing beats a good weak signal source and RF voltmeter so you can "play with the adjustments" longer.

NNote that even though the "books" indicate capacitive coupling steepens the lower frequency skirt of the curve, my tests show only slight differences. Oh well, it is better and it's easier to construct than link coupling so..."go for it".

The diagram and graph should provide sufficient data to enable duplication.

Happy building!!!

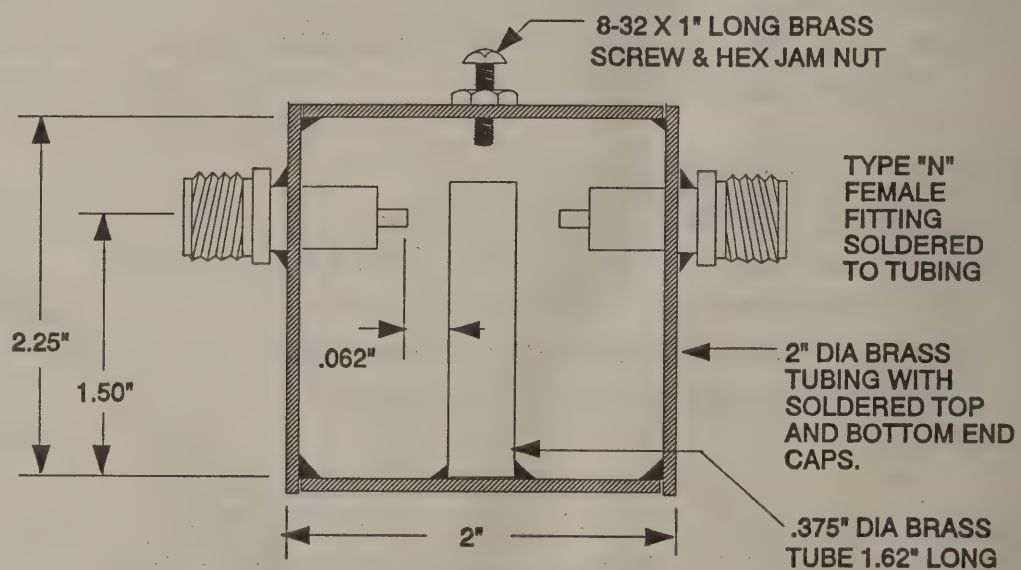
Art...WA8RMC

Note that even though the "books" indicate capacitive coupling steepens the lower frequency skirt of the curve, my tests show only *slight* differences. Oh well, it is better and it's easier to construct than link coupling so..."go for it".

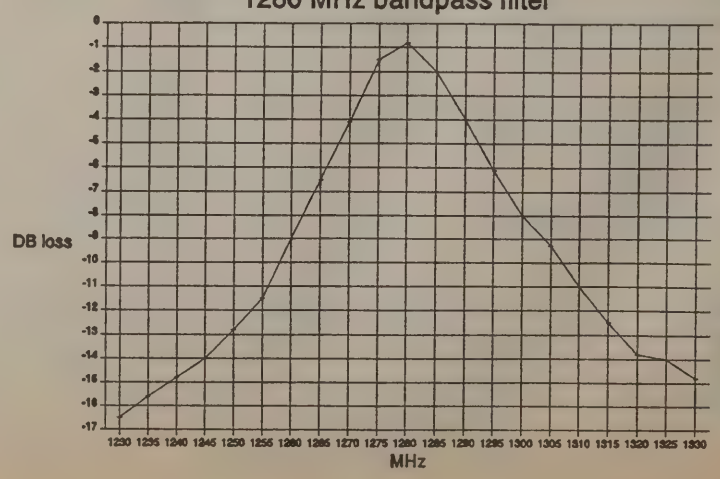
The diagram and graph on the right should provide sufficient data to enable duplication.

Happy building!!!

Art...WA8RMC


8-32 X 1" LONG BRASS SCREW & HEX JAM NUT
TYPE "N" FEMALE FITTING SOLDERED TO TUBING
2.25"
1.50"
.062"
2" DIA BRASS TUBING WITH SOLDERED TOP AND BOTTOM END CAPS.
2"
.375" DIA BRASS TUBE 1.62" LONG

1280 MHz bandpass filter



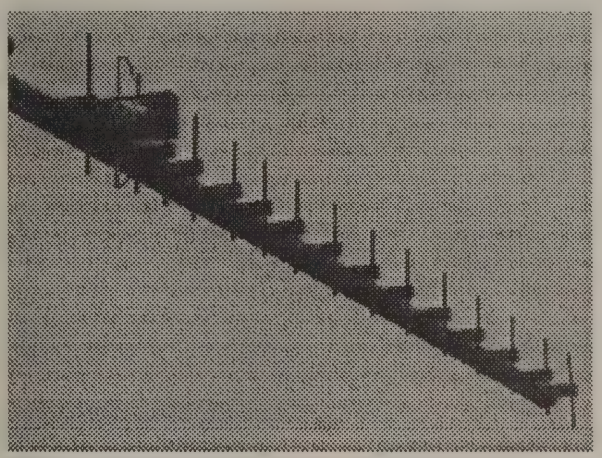
# PRODUCT REVIEW OF THE SWIECH COMMUNICATIONS SYSTEMS 23 cm YAGI ANTENNA

Mike Collis, WA6SVT

Product submitted for review is the Swiech model COY23CM16EL, a well machined 16 element Yagi. The manufacturer rates the antenna at 12.25 dBd gain with a very low VSWR over the entire band. They also rate the feed as well sealed and the antenna as strong enough for mountain top installation.

Construction Quality

I have heard these type of claims before so I put the antenna to the test. Gene Swiech allowed me to pick out any antenna from the assembly line. I chose to pull one out of a box that was due for shipment. I asked how strong are the element insulators, remembering a similar antenna design from Europe that dropped some of its elements after the first ice storm of the season. Gene assured me that the insulators were very strong and UV resistant. With the elements face down on the concrete floor, I proceeded to walk along the boom from the reflector to the front director of the Yagi. Gene was yelling, "Mike, what are you doing."



I replied your antenna passed the first phase of the mechanical test. Next, I took the antenna and hooked the first director's insulator over a support bar on the garage door and then I held on to the boom and hung my entire body weight (180 pounds +) for several seconds. By this time Gene thought I was certifiable for the nut house. As far as I am concerned, the antenna should survive most any weather mother nature can dish out. One nice feature is all hardware is stainless steel and the feed is completely potted to seal out moisture. The antenna has no burrs or sharp edges to get cut on and the antenna is anodized black. Quality is the best I have seen so far on VHF and UHF for neatness and materials used.

Gain and VSWR

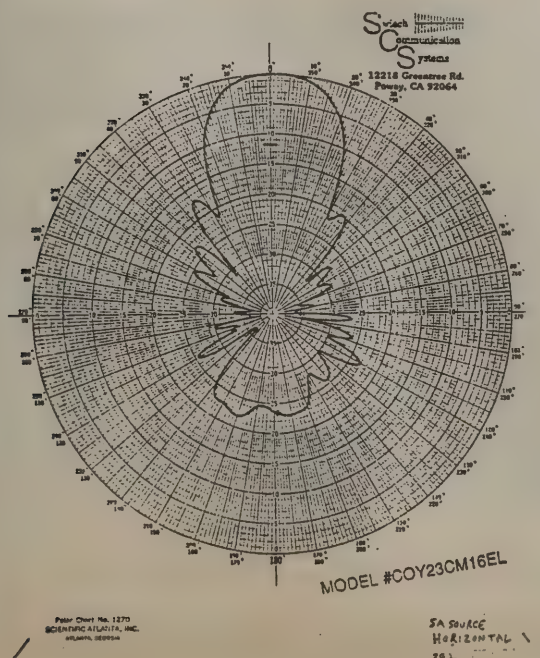
VSWR is as stated. It has a 1.2 to 1 over the band and in two places, one at 1250 MHZ and the other at 1280 MHZ, the watt meter would not move at all on reflected power even with a 5 watt slug with 3 watts of power applied. Now for the gain test, I used two tests. A near field test using a signal generator, test dipole and spectrum analyzer. Far field test was the second one using the Santiago peak repeater 39 miles distance across the valley floor from my mountain top QTH and a spectrum analyzer. The results were averaged and the gain is 12.4 dBd on a four foot boom!

Ease of Assembly

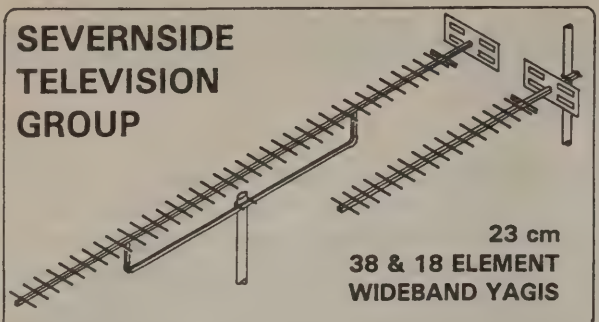
The antenna comes ready to use right out of the box. The box is great to use to store the antenna for portable use.

Final Comments

This antenna lives up to every thing that the manufacturer claims and the only thing left to complain about is when is its big brother with long boom and 16 dBd or more gain coming out? I would recommend this antenna for repeater links, ATV and general 23 cm band use. Gene also manufactures antennas for six meters through 23 centimeters with the same workmanship and quality materials as described here.



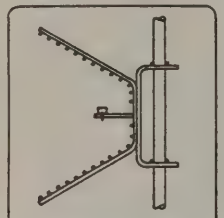
# SEVERNSIDE TELEVISION GROUP



23 cm
38 & 18 ELEMENT
WIDEBAND YAGIS

All of our 23 cm Aerials are specifically designed for ATV use - although they can be used for other modes aswell. Wideband characteristics mean that you need only *one* aerial to cover the repeater input and output channels. Our famous wideband yagis come fully assembled in two versions :
**38 ELEMENT HIGH GAIN** : 14 dB gain, 1.8 m long, £26.00 plus postage.
**18 ELEMENT STANDARD** : 10 dB gain, 0.9 m long, £15.00 plus postage.
Don't forget our **20 ELEMENT CONVERSION KIT**, which converts your existing 18 element aerial to the full 38 element high gain specification : £13.00 plus postage.

Our 23 cm **TROUGH REFLECTOR** is quite unique, combining 11 dB gain with wide bandwidth *and* wide beamwidth. It's also compact, just 0.55 m high, 0.35 m wide and 0.3 m deep. Supplied as a kit of predrilled and preformed parts, for easy "screwdriver assembly · £19.00 plus postage.



TROUGH REFLECTOR
SIDE VIEW

All aerials feature an SWR of less than 1.5:1 and are supplied with mast clamps suitable for masts up to 55 mm diameter. Mast poles shown are not supplied.

**POSTAGE** : £3.75 for one aerial, £5.00 for two or more. Telephone orders with cash on delivery : £2.75 supplement per order. Orders from outside of the UK - please write for carriage quotation.

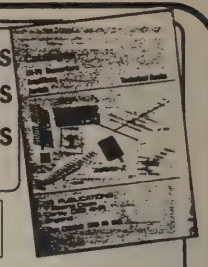
**CHEQUES** payable to "SEVERNSIDE TELEVISION GROUP" and send to 15, Witney Close, Saltford, Bristol BS18 3DX. Tel. 0272 860 422 ( office hours), 0225 873 098 ( evenings & weekends ), Fax. 0272 869 387. Please allow 28 days for delivery.

---

HS PUBLICATIONS
7 Epping Close
Derby DE3 4HR
England

0332 38 16 99

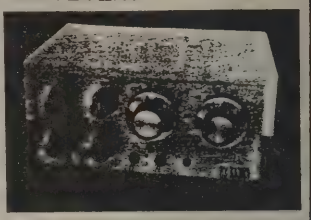
**Aerials**
**Amplifiers**
**Technical Books**



OUR CATALOGUE IS AVAILABLE AT £0.75.
IT LISTS LOTS OF PRODUCTS AND PUBLICATIONS UNIQUE TO OUR COMPANY.

## *NEW!* DX-TV TUNING SYSTEM

Specially designed 'consumication-styled' equipment for effective VHF and UHF DX-TV reception, featuring variable I.F. vision bandwidth. Double-superhet principle of operation; the D-100 connects to the aerial input of a UHF TV thus providing additional I.F. stages, resulting in superior sensitivity and selectivity. (A rotary-dial TV, e.g. a portable, etc, allows optimum selectivity adjustments to be achieved more conveniently).



- VISION IF BANDWIDTH REDUCTION
  A reduced I.F. bandwidth lifts the reception threshold thus helping to resolve weak signals that are normally lost in the noise when using an 'up-converter' or a multi-standard TV receiver with its inherently wide-bandwidth I.F. stages. Bandwidth reduction improves selectivity too, thus assisting adjacent channel reception, particularly in Bands I and III where interleaved channel allocations occur.
- THE ULTIMATE IN DX-TV RECEIVERS!
  Our latest model, the D-100 <SUPER>, features AGBC (Automatic Gain and Bandwidth Control); as the signal becomes stronger the vision I.F. bandwidth widens, thus providing optimum picture quality. Manual I.F. bandwith control is also provided.
- MULTI-SYSTEM SOUND (via FM radio)
- AUTOMATIC BANDSCAN
  -useful when an opening is imminent.# Speed adjustable.
- VHF/UHF COVERAGE (typical)
  Bands I/II (Lo-band); 44-90 MHz, Band III; 110-230MHz, VHF; 470-850MHz (470-690MHz using car battery).
  # Wideband I.F. output facility.
  # Converter output; UK channel 65 (adjustable).
- DUAL POWERING FACILITY
  Mains or car battery # 110V version available for USA.
  Each individually-calibrated unit comes complete with instructions, TV systems map and channel relationship plan.
- PRICE: UK £124.95 (inc. P&P).
  (Air/Eur add £10.00, Air/USA add £25.00 (110V version).
- A SPECIAL 'SPORADIC-E' PACKAGE SYSTEM IS AVAILABLE WHICH INCLUDES THE D-100 <SUPER> DX-TV RECEIVER PLUS A CHOICE OF LO-BAND AERIAL FROM THE FOLLOWING SELECTION:-

  **BAND I CROSSED DIPOLES (CR-1000)**
  # Connect internally for multi-directional coverage or use the switch provided to use each dipole separately.
  # 1.5m mast and loft clamp provided.

  **THREE ELEMENT ARRAY (VF-1300)**
  # Covers 48-70 MHz (Band I channels E2-4).
  # Ideal outdoors where rotation is possible.

  **FOUR ELEMENT ARRAY (VF-1400)**
  # Covers 48-110 MHz. # Ideal for both TV and FM DX-ing.

- 'SPORADIC-E PACKAGE' PRICE: £150.00 (Inc, UK delivery).
  (Eur/Air add £30.00, USA/Air add £50.00).

(ADD $5 FOR ACCESS/VISA PAYMENT FACILITY)

To find out more about TV DX-ing why not send for a copy of 'DX-TV FOR BEGINNERS' by Simon Manar? It costs just £4.00 (includes P&P UK and Europe).

SEE US AT THE TELFORD AMATEUR RADIO RALLY
ON SUNDAY SEPTEMBER 4TH.

---

# WORTHING & DISTRICT VIDEO REPEATER GROUP

## GB3VR GB7VRB

### AMIGA ATV PROGRAM

The Amiga ATV program as seen at the BATC show now has over 45 different selectable testcards with a host of additional features including 20 different wipes, full text control,now with 30 screens of text messages available, QRA calc, Testcard Music, selectable displays, all cards are overscan ie the whole screen is used.

Load in your own customised testcards, Large characters, Scrolling messages, 24Hr Clock, C/S extensions, Hot key operation, Doc reader, ATV CLI, Cross Hatch, Purity and also a comprehensive section for Gen-lock users.

If your interested in ATV then this program is for you. Two disk set, 1 Meg required. Please state callsign and QRA (if know) when ordering. £20.00

### 1W FM-TV 24cm TRANSMITTER

This transmitter generates its singnal directly at the wanted frequency which may be set anywhere in the band colour or B/W. On-board intercarrier sound and fixed pre-emphasis are standard features. The kit includes diecast box and cost £80.00

### TWO CHANNEL PHASE LOCKED LOOP KIT

This add on vastly improves the overall frequency stability of the 1 watt transmitter. Two crystal locked channels and third free running tuning position are available. Kit price only £30.00
Crystals for the PLL on channels RMT1,2,3 or simplex 1255Mhz £8.00. Other frequencies to order.

### VIDEO AGC KIT

This unit accepts a composite video signal in the range 0.15 to 2V P-P and outputs a constant 1V P-P accross 75-Ohms. This unique design is a must for TV stations and repeaters. £16.00 each.

### THE SPECTRUM ATV PROGRAM

This 48K version has over 60 commands which includes 7 Testcards, memo pad, clock, maps, tones, locater calc (old & new), flag, x-hatch, various size text printing plus disk transfer command and more. All this for only £6.00
Opus disk version £6.00 a must for all spectrum owners.

**BBC AMATEUR TELEVISION PROGRAM £8.50**
**COMPREHENSIVE ADD ON'S SAE FOR DETAILS**

**ORDERS TO:-** TREASURER OF GB3VR, R.STEPHENS G8XEU, 21 St.JAMES AVE, LANCING,WEST SUSSEX, BN15 0NN. 0903 765760 7 to 8 pm
CHEQUES PAYABLE TO:-
'Worthing and District Video Repeater Group'

---

# Camtech Electronics

*New Products*

21 Goldings Close, Haverhill, Suffolk, CB9 0EQ, UK
Tel: INT +44 (0) 440 62779; Fax: +44 (0) 440 714147

### High Frequency Video Demodulator Card.

Features 130 MHz IF input frequency, Plessey video demodulator, Switchable CCIR video de-emphasis + video invert and switchable meter functions, signal strength / tuning meter. Video output - 75Ω composite video. Audio demodulated outputs available are 600Ω 0dBm and 0.5 Watt loud speaker amplifier. This unit is to the highest quality construction using plate-through hole PCBs with selective solder resist finish. Available in kit form or ready assembled.

### Microwave Tuner / Down Converter.

Features the very latest in commercial microwave integrated circuits and surface mount technology. Ultra low noise PHEMT GaAsFET front end followed by stripline image filter and MMIC amplifier to a 5 GHz Gilbert cell mixer. Exhibits 35dB conversion gain and tunes (LO) 800 to 1600 MHz, with an IF output up to 200 MHz. Also features an external LO output to drive a synthesiser, such as Camtech 2.4 GHz synth board. Unit comes completely ready assembled with instructions.

### TV Audio Modulator.

A full featured audio modulator to compliment your video station. Contains microphone amplifier, 50µs pre-emphasis filtering, speech compressor, 15 kHz low pass filter and modulator / 5.5 to 6.0 MHz oscillator. Output is fully buffered and filtered to provide 0dBm @ 75Ω modulated ± 50 kHz. Available in kit form or ready assembled.

**For details on these items or a copy of our latest Catalogue, please write or phone to the address above. Credit card facilities available.**

# WEATHER RADAR

July 1, 1994
Dear Henry:

At the ATV forum and hospitality suite in Dayton, I met a ham from the Columbus, Ohio area who was successful in getting a NTSC feed from Cavoris (I hope the company's name is spelled correctly) for ATV transmission of the NWS WSR 88D Doppler Radar display for SKYWARN.

Unfortunately, I don't remember his name; however, he did say that you were very instrumental in helping his group get a feed from Cavoris for no cost at all. Evidently you were able to send him some type of a letter or contract from Cavoris allowing him access to the Cavoris NTSC feed. Is that letter still available and can the St. Louis ATV Society get a copy of it? We'd like to transmit the WSR 88D display and this may just be the thing we need. I'm very active with SKYWARN.

I don't have a fax at home, but my home phone number is 314-397-2510 or my address is #5 Cricklewood Lane, St. Peters, MO 63376. Thank you for your time and I look foward to hearing from you soon.
73 es G1, Ron, KOZ

*ED Reply: I received the fiurst ever license from Kavorus while operating the KB9FO ATV repeater/remote base while at NBC, over 8 years ago. Since then, several groups have been able to get a license to use this and other services based on our first effort (which took 3 years!) Likely the person you met was Art WA8RMC, editor of the ATCO newsletter and the Columbus, OH ATV repeater. See the big news feature a few pages back for more info.*

# more Hawaii - CA efforts

We leave for KH6HME's QTH tomorrow morning. Taking Paul a TVCX4 crystal downconverter so he can try a two way record. We will be back on the 5th. I'm going to run the Volcano's Marathon while there. Maryann is doing the 10 mile race. Only three stations saw the video: WB6NOA, KC6CCC and WA6BHF. CCC was the farthest, but anyone in the San Diego area would have been the record. Maybe next opening you could fly out and set up at Point Loma?

Joel Kleinman, N1BKE, an associate Technical Editor with ARRL asked me for all info on ads and articles in other mags pertaining to illegal 70cm ATV transmitters. Maybe the League might be interested in doing something to get the FCC fired up and get rid of these companies that are selling ATV transmitters to anyone to use for police, security, surveillance, etc. If you have any of that suff filed away, you might make a copy and send it along to him. You don't want to move until the next storm takes down the antennas again, do you? 73, Tom W6ORG

*ED Reply: Next time have him hold up his ATVQ Q# certificate! With 5 acres, and two towers going up right away, I will be ready for the winter/spring storms and ice! May increase the 439 effort from 8 M2 yagis to 16 M2 yagi's. The four 33' boom 2 meter M2 antennas will go back up. Will add the Moseley Pro 97 40-10 HF yagi on tower #2 and a W9INN 160/80 full size dipole between them. Six meters will gain from a full size HyGain BA6-6. That with my Henry (Tempo) 6N2 amp and Henry 4K should shake the E/F layers! The 1296 quad loop yagi from Downeast and the 200 watt amp will wake up some SHF DX in SSB FM and video modes too. No amp/tower/coax is too big, Need 300' 1 5/8" Heliax got any?*

# COMMERCIALS WE WOULD LOVE TO SEE

SKIP OVER THESE IF YOU ARE LOOKING FOR CLASS OR ARE REPULSED BY BAD HUMOR!

## IN BAD TASTE!

(cut to commercial)

They say if you want a good meal, eat where the truckers eat. At Road Kill Cafe we specialize in fast trucker food. Road Kill burgers, made from prime Kenworth mash, sizzled on asphalt in the noon day sun til golden brown, scooped up and served warm and steamy on a week old sesame seed bun with wilted lettuce, smashed tomatoe and crushed pickles and our special tangy blood red sauce. Truckers gladly make a detour for our Mack Truck Chili, Peterbilt pancakes and Transtar turkey patties. This week's special Armadillo Burgers and Gator chips with cow pies and road apples. And don't forget our mashed potato special all this week, fresh from Yellow Truck Line crash last night on Route 40. Our food is so tender even people with no teeth eat here. Road Kill Cafe, if you can figure out what it was, we didn't fix it right. Road Kill cafe, more than a meal, a great American adventure fresh from the open road.

You never hunger for more after finishing a McWaddles meal! Health conscious patrons try our new no salt no sugar quarter pound grease burger, made from 100% pure American lard, cooked in 100% pure American lard and served on a 100% pure lard bun. For a special treat our quarter pound grease burger with imitation processed cheese or our quarter pound bacon grease burger dripping with flavor and not a spec of meat. Pure and natural with no preservatives, no artificial colors, no artificial flavorings. Slide on in today and experience the difference pure lard can make in your diet. This week get a double lard burger with cheese for only 69 cents with any order of lard fries. Don't forget to try our new Lard shake flavor of the month, rutabaga. Only at McWaddels

[music] At McWaddles today,
we help you weigh,
more than you did,
yesterday! [music out]

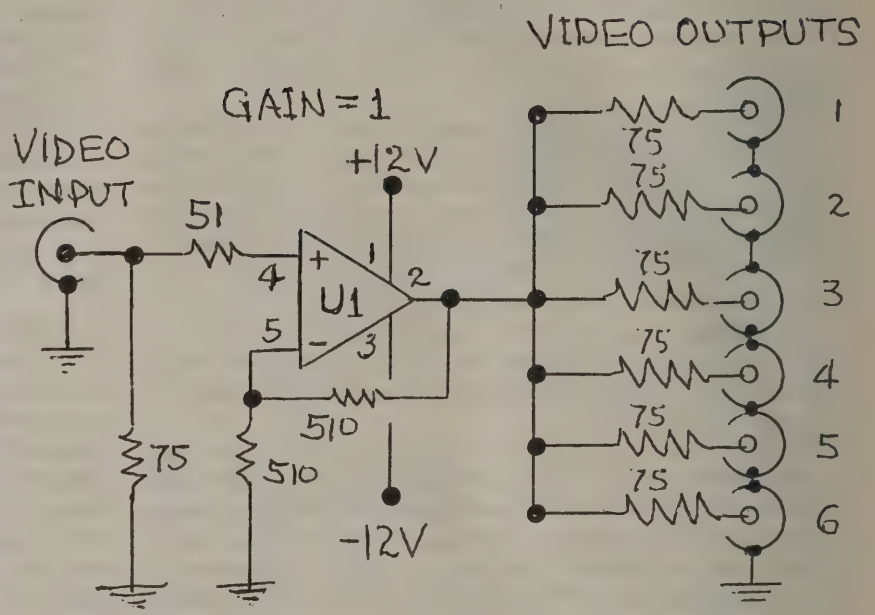
The Holy Cow Restaurant, serving the best in southeast Asian food. Today's menu includes Basset burgers, Beagle Bacon and Egg, and Beagle chops with mint jelly. For the bigger appetite, our lads and lassies really enjoy our Collie Delight. Or for a family outing, Shepard for four. All our meat is USDA inspected and fresh from a neighborhood near you. Harvested nightly and prepared in our own kitchens under the guidance of the famous Chef Wolf Hong. Our Special this week is Poodle Doo Soup with noodle served with Pit Bull Dung. Yes, Schezwan was never this good. Russians wolf down the meals here! Each meal tastefully prepared and served in the quiet surroundings of our kennel. Don't bitch about the high prices at those other restaurants, come to Holy Cow for an unforgettable meal at dog gone low prices. Holy Cow, located next to Leash and Collar Pet Stores in beautiful downtown Setterville.

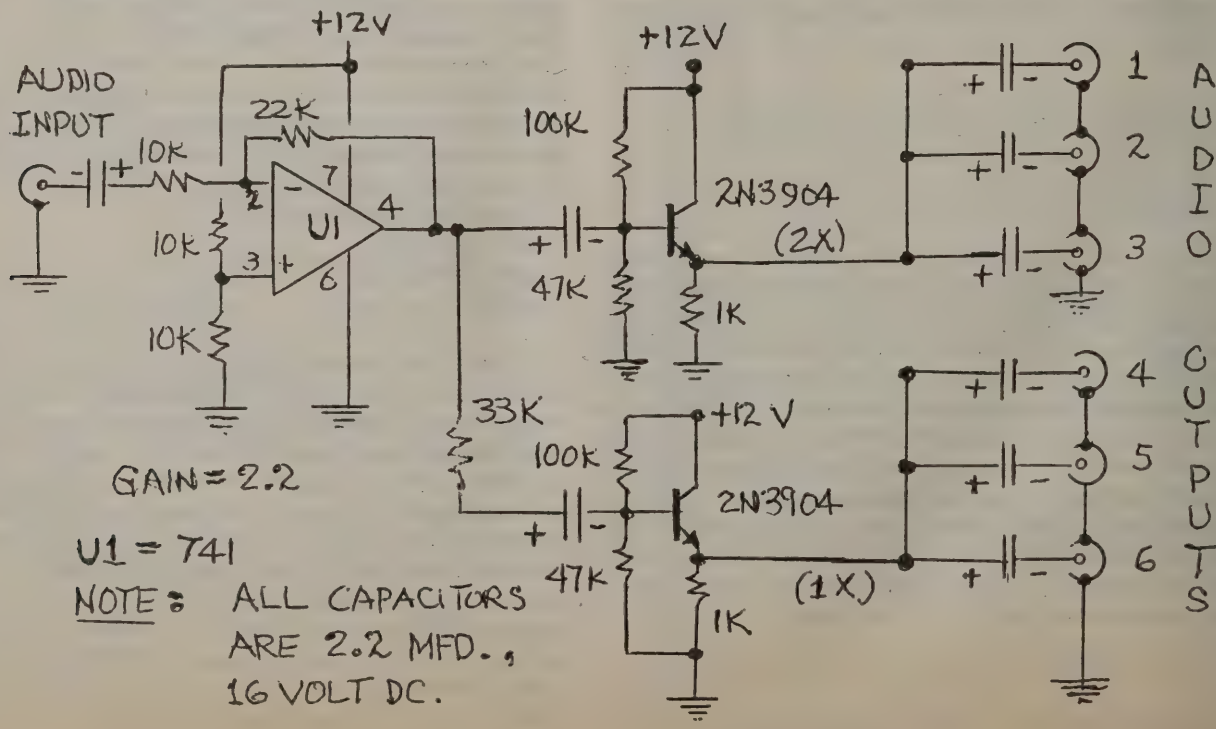
# BUILD A VIDEO DA

## KB0GL

The video mismatch problem of feeding two ATV transmitters from one receiver was resolved here by using an ELantic video amplifier IC. The Minneapolis-St Paul repeater 439.25 output of the Blonder-TOngue receiver is fed to the 421.25 and 1265 (FM) transmitters. W0OZI designed and built a distribution amplifier as shown on the accompanying schematic. The EL 2099c is a high gain operational amplifier and features excellent video performance. The EL2099c drives six double termination outputs each 60 feet long. The double termination results in reflection free performance. At present we are using only two putouts, the remainging are each terminated in 75 ohm resistors.

Also shown is the separate audio section. Here three outputs are X1 amplitude and the other three are X2. These two units are doing an excellent job for the system. For more info on the video chip call the manufacturer at 408 945 1323.



# *SAGE ADVICE FOR STARTING OUT*
# *by Tom W6ORG*

## ANTENNA SYSTEMS

The antenna system is *the most important* part of your ATV system. Trees, foliage, houses, etc. greatly absorb UHF energy. Compared to FM voice systems with the same power, antenna, etc., just the system bandwidth going from 15 KHz to 3 MHz in the receiver will decrease your sensitivity 26 dB. With this bandwidth the noise floor is around .8 V. So you can see quality coax and high gain antennas up as high as possible are necessary to make up this difference compared to the DX you are used to with FM simplex.

Find out from local hams which polarity is in use. Performance in the 70 cm band is the same for horizontal or vertical, but cross polarization can cost you up to 20 dB. Areas which have had most hams come to ATV from 432 MHz weak signal CW or SSB will tend to be horizontal, and those that were on UHF FM or more into public service and mobile will be vertical. Most repeaters will be vertical due to the lower cost and ease of buying omnidirectional gain antennas.

Antenna separation should be at least 7 ft, in line, driven element end to end spacing with 33 or 23 cm antennas for duplex ATV or crossband repeater work.

Antennas for ATV work must also have broad bandwidth as well as gain. Most high gain Yagi types have only 1% bandwidth, or 4 MHz at 70 cm. This will give less gain and higher VSWR to the most important color and sound subcarriers assuming that the antenna was cut for the exact video carrier frequency in the first place. The best true reference for antenna gains and performance is the results of the various VHF/UHF Conferences antenna measuring contests held annually and publicized in the ham magazines. Advertising claims have become mostly wishful thinking and sales hype.

Some broadband beams that have proven out on ATV over the years are the KLM 440-6x, 10x, or 16X and the Rutland FO22-ATV. The 6 element antenna is only 28" long, end mounted, but has 8.9 dBd gain. The 10 element is similar with 64" boom and 11 dBd with a 10.5' boom length. Fo22 is highest at 15.8 dBd and 14 ft. The KLM 435-18C is a circularly polarized beam with 12 dBdc gain on an end mounted 7.3' boom. Circular polarization lets you work all modes and antenna polarities plus has the added advantage of less multipath dropouts and ghosts than a fixed polarity. The AEA 450 Isopole is a good 3-4 dBd vertical omni and the Diamond F718 with 9.3 dBd for simplex, portable and public service work.

## ANTENNA CABLE

Use only new or tested low loss coax that has at least 95% shielding. We suggest Belden 8214 (3.8 dB/00' loss) or 9913 (2.5 dB loss at 400 MHz). RG213 or 214 is fine but has a loss of 4.7 dB/100'. For runs over 100' you may want to consider investing in some good copper hard line and/or an antenna mounted low noise preamp such as the Mirage KP-2 which also has automatic T/R switching. An antenna mounted preamp can increase receive sensitivity by an amount equal to the coax loss.

Use type N connectors for all outside coax connections. Take care to properly put them on the cable. Prevent moisture contamination of the coax by wrapping all connections with two layers of vinyl tape. Coax Seal is also good. Then spray all connections and antenna with *clear epoxy* paint. Colored paint may have conductive particles in them that will affect the antenna gain or match or give intermods. Moisture in the coax results in increased loss and greater possible intermod interference. If moisture contamination is suspected, peal back the braid and look to see if it is still bright. If it is oxidized, replace it. VSWR will actually look better with the higher loss from moisture contamination.

**DX**

"What kind of distance can I expect?" is the most asked question. There is no pat answer because of all the variables. But for a practical snow free picture with a 42 dB sync to noise ratio it is 22 miles. This is based on line of sight, KLM 440-16X beams, 3 dB coax loss, and either the TC70-1 or KPA5 1 watt transmitter.

For greater DX most of your time and effort should be in the antenna system...bigger antenna, lower loss coax, greater antenna height. This will improve both transmit and receive conditions. DX will double for every 6 dB of change. Antenna placement should be away from and above trees and roof tops. The RF horizon on flat terrain for an antenna at 50' above ground is 10 miles. Foliage greatly absorbs 70 cm energy. You can experience non-line of sight DX depending on reflections, temperature inversion skip, and use of ATV repeaters.

**TV SETUP**

Any TV set or VCR tuner should work well with the ATV downconverter. Preamps should not be added, except at the antenna (Mirage KP2), as there is plenty of gain in the downconverter to reach the noise floor. Too much gain encourages intemod interference and dynamic range. 75 coax must be used between the downconverter and TV sets antenna terminals. Do not use twin-lead as it can act as an antenna.

Set the TV tuner to channel 2, 3 or 4, which ever is not used in your area. With the downconverter connected but *not on*, rock the TV fine tuning back and forth to make sure you are right on the selected channel and that there is no adjacent channel interference. Then turn on the downconverter and slowly tune the downconverter tuning knob for a known close by station that is on the air. A 2 meter simplex ATV coordination channel is very handy for talking in the stations picture for antenna alignments and other adjustments. 144.340 and 146.430 simplex are the most popular.

# ATCO NEWSLETTER

The ATV repeater has been operational for about 8 months now and is still working OK. Some improvements are being made as well as repairs to existing equipment. Be patient... (I said that last time) as it's hard to do intense repeater work during the summer when so many other chores must be attended to. A major repeater rebuild is in the works as well as receive site enhancements so "stay tuned" and look inside for details.

ATCO SPRING EVENT MINUTES

The first annual ATCO ATV Spring Event party on May 15, 1994 was a success. We had 16 participants with some who came from as far away as the Dayton Ohio area. Food was provided by Rick, WA3DTO with some assorted goodies by others. A number of donated door prizes were handed out to everyone. Everyone went home with some treasures.

After we got our fill of the delicious food, we held a short meeting mainly to bring everyone up to date with the things we're working on and to discuss the possibility of having a "Summer Event". All agreed that it would be a good thing if we could coordinate it with the Columbus Hamfest.

We were informed that Fred Yost K8JGY is moving to South Carolina so we needed a new Treasurer. Bob Tournoux accidently raised his hand to scratch his back and before he could finish, a treasury log book was planted in it. He agreed to assume the duties nevertheless.

The event participants are as follows:

Rick White WA3DTO
Greg MacCartney N8ZTL
Phil Morrison WA8TTE
Art Towslee WA8RMC
McEldowney WB8DZW
Taft KA8ZNY
Bill Heiden WB8URI
Fred Yost K8JGY
Bob Tournoux KF8QU
Dick Goode W8RVH
Jake Fuller W8WAU
Shaun Miller KB8MDE
Foster Warren W8EHW
Roger Charles Beener WB8LGA
Tom Martha Yost KA8GWX
Ken Morris WA8RUT

## REPEATER ACTIVITY

### ..... from my workbench

Well, I wished for warmer weather and got it. So should I complain when it happens? Maybe not but I don't think it'll change anything so here goes...IT,S TOO #!@@*$ HOT NOW - BACK IT OFF A LITTLE!!! There. I feel a lot better. Now where was I? Oh yes, the grass has just been cut and I'm enjoying my reward. Only one clue... the can has a picture of a team of horses on it. Tastes good at this point too. After this I need to paint the house, fix the car and...OK, I've thought about it enough now so on to the good stuff.

The airport radar unit is finished and installed at Columbus airport. Although it is not as good as I had hoped for it is about as good as I expected it to be at this time. The unit took much too long to design and build. Someday I'll learn that when I start from scratch, things don't always go together correctly the first time. I was helped along by the supplier of the RF amplifier brick which turned out to be bad and had to be shipped back for a new one. A month later it arrived. Even after I got the final unit working and had sufficient run time to consider it defect free, roadblocks (tree in this case) stood in the way. I found that the best line-of-sight path from the National Weather Service to downtown had a 40 foot oak tree in the way. Since the antenna elevation is about 30 feet, all it sees are leaves. The transmitter output is about 8 watts which I felt was sufficient at the time but unless we find a willing person with a chain saw, we'll have to settle for a P4 picture for now. I'll continue to work on the decoder so the radar signal won't have to be watched with a TV camera. More on this unit later.

I've also been working on the new receive site 439 and 1280 MHz antennas. Thanks to Shawn KB8MDE who built the dual slot antenna, only fine tweaking was required to put the gain where it should be. In fact, when I finished, it turned out to have more gain than any of the designs I've tried. This is the case in spite of the fact that he used a smaller diameter pipe. He used 3 inch nominal aluminum electrical conduit which has an outside diameter of 3.5 inches. The gain turned out to be an honest 8 dB. I was so amazed that I tried numerous locations around the yard to take a new gain check. Each time I got 8 dB so now I believe it. More on this later.

The 1280 MHz antenna was not quite so easy. After wearing a track in the grass going back and forth from test position in the yard to workshop and back many times, I finally got an acceptable gain of 4 dB for a single slot design. Again, more on this one later.

Amid all of the repeater work, I've managed to squeeze in a bit of other workshop handy work. First of all the bench got a good cleaning. To my surprise I found some tools that I've been blaming the kids for loosing long ago. Should I tell them?... Nope! Next, I fixed the VCR. Now I've got something to record proof of that next rare DX that's going to show up any day now. The next thing to do is build a tall shelf for a couple of monitors so I can watch more than one frequency at a time like Rick WA3DTO does. That's all for now. Back to work. Art...WA8RMC

# THE COLUMBUS AIRPORT RADAR LINK IS UP AND WORKING

I finally finished the airport radar link transmitter to the repeater. As I mentioned earlier in the newsletter, the build process did not go as smoothly as I had hoped. However, that's behind us now so let's look forward. The digitizing converter required to make the radar signal NTSC video compatible is not complete yet, however. To fill in in the meantime is my B/W camera pointed at the radar screen monitor at the National Weather Service. Even that is not the best till we get the better monitor pointed at the camera. This is easy to rectify for all that's needed is a better shelf to put it on.

The up code is CMH (264) to bring it up for 5 minutes. To shut it down before the timeout simply punch #. Note that after punching the up code there is a 2½ second delay before the transmitter goes on the air. This is done to allow code sequences with 264 in them to not bring up this signal. The logic looks for the 3 digit 264 sequence and if it finds more following tones it resets.

For those that are interested, a simple block diagram of the complete system is shown below.

## ATV ACTIVITY IN CLEVELAND

Well, here's the scoop from the Greater Cleveland area. All the activity is on the 439.25 frequency due to the line "A" situation up here. There is some dabbling in the 900 band, but only a little for experimenting. The talk frequency is the standard 144.34 along with 144.31 and 144.37 due to heavy activity in the area. During an evening session there will be three or more different QSOs going on at the same time, so the other frequencies are necessary to keep the peace. All of the ATV antennas are horizontal beams along with two-meters, this has been great since we all beam at each other anyway, there is never a problem working into the noise on two-meters ( DX ).

There are about fifty active ATVers in the greater Cleveland area; some of them will be listed later. There is plenty of daytime operation with a good portion of the senior folks retired and they are really active in building antennas, preamps, tube tx amps, and filters. This has been helpful for the folks that work all day and enjoy ATV at night, but the day crew still comes on in the evening which keeps us informed of any good band openings that may have come up. Along the North-Shore area there a some great band openings that are due to the lake effect, some times the folks along the lake up to five miles inland will work stations 200 to 300 miles while the folks that live up in high country 1300 ft. away from the lake won't see a thing except a sync bar or two.

Cleveland is blessed with line "A" as mentioned before. This was originally for the Canadians benefit, but low and behold money bought the frequency space from 420 to 430 and this is now loaded almost full with commercial user's, mostly cities surrounding Cleveland. We have had the same problem as most with the FM repeaters moving down the band into the ATV passband 438 to 444. There was one incident recently that really was great, A repeater operator requested a freq. pair and the Ohio council originally gave him 443 something and he did not want to interfere with the ATV'ers, so they finally gave him a splinter pair above 444 and all are happy now.

The Cleveland group is going to keep horizontal on ATV so this will help with the interference problem both ways. Many of us are using band-pass and notch filters to help out in this situation also. There are a good portion of us that have as much money or more in equipment than most of the repeaters could ever come up with for this mode of operation and we hope to be able to keep on using the mode for a long time. The majority of folks are using PC Electronics, along with AEA, Wyman, and some of the other gear around. I would say most all have 50 to 100 watts with 14 dB gain antennas at 50 feet or so along with preamps and such. There are about half that are using computers for graphics displays, along with three that have the Video-Toaster married to their Amiga Computer ( WoW what a show ). Overall there is a good feeling up here and we are having a good time with this great mode. Since Dayton there are three new folks that have come on line and I'm sure more will come soon.

For all you folks that thought there were only fish up north get your fishing poles out and let's catch some DX.
Here is a list of some ATVers in the Cleveland area:

| | |
|---|---|
| N8IXU - BOB | W8AC - JIM |
| K8JAS - JOE | W8DOE - JOE |
| KB8ZW - BILL | WA8EYG - GEORGE |
| W8RRA - HANK | WD8DAH - KEN |
| N8MGU - LARRY | WA8ZUM - CHARLIE |
| KB8FKM - MARK | N8NBC - DAN |
| W8KDT - FRENCHY | WA8ARY - BOB |
| KE8YX - GEORGE | KE8WU - SHAWN |
| WD8RPT - JIM | N8RPX - ERIC |
| N8ZTZ - MICHELLE | WA8WOJ - DALE |
| N8MXR - ROD | KO4QN - HOWARD |
| KB8MTZ - AL | WA8SAJ - JEFF |

These are just a few off hand that I thought of during my writing of this article. Hopefully we will work some of you folks when the band opens up towards the south. So here's looking at you.
Jeff Covelli...WA8SAJ

## DUAL SLOT ANTENNA UPDATE

I've had a chance to experiment more with the 427 Mhz dual slot antenna that I described last year in the ATCO newsletter. Since then, Ron WA4GSS has built 2 of these antennas for his repeater in Ashland Kentucky and asked me questions about them. As a result of the discussions, I offered to test them in my back yard if he would bring them here. He seemed anxious to determine if the gain was as expected so we had our chance.

He built each antenna out of 3½" aluminum electrical conduit (3 "OD) which has a ¼" wall so it is very sturdy. This stuff is great because it is not only has a thick wall, but it's readily available at electrical supply houses, it comes in ten foot lengths (a perfect length without cutting) and is threaded on each end. Connect a cap to one end a coupling and reducer to 2" pipe on the other end and a perfect mounting section is formed.

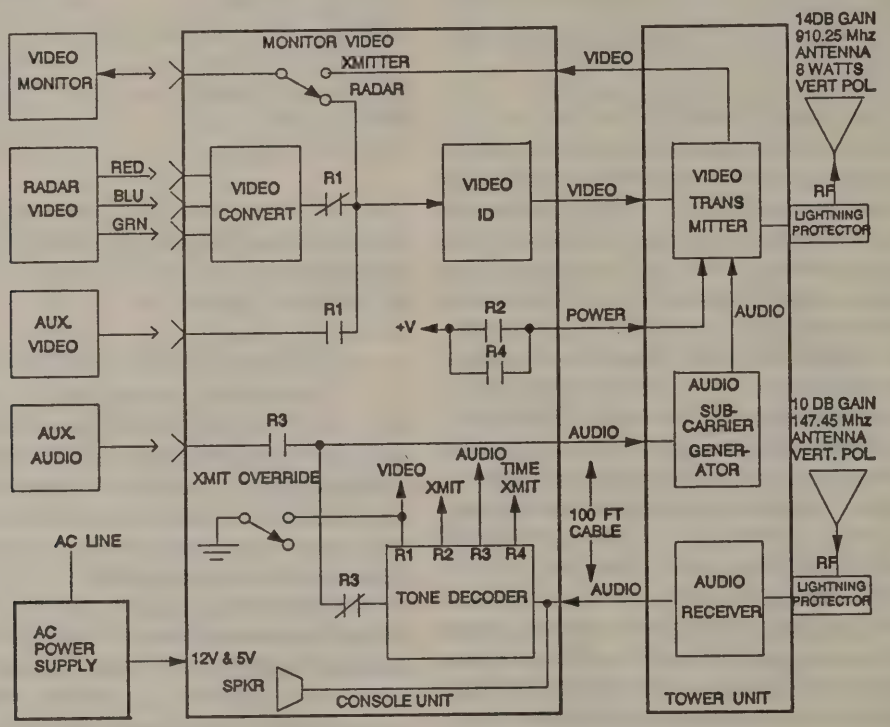
The first antenna tested out good but needed a little capacitance at the feed point of each section to bring it up to about 7 dB of gain. (My antenna tested to be 7½ dB). The next antenna wasn't good at all. We played with it for quite awhile till we discovered it was resonant at about 430 MHz and we needed 421 MHz. Replacing the phasing harnesses with pieces that were each about ½" longer did the trick. Important point here: an error of ½" makes a great difference to the gain. Also, it's hard to cut the lines exact the first time because it's hard to determine how to measure exactly to the true feed point. It's best to build it a little long then test the gain at various frequencies to find where its resonant and trim from there. After installing the new harnesses and adding some feedpoint capacitance the gain also was about 7 dB.

Since then I tested our repeater receive dual slot antenna (built by Shaun KB8MDE) and found it to have even more superior gain. He used 3" electrical conduit which has about a 3½" outside diameter instead of 3 ". After trimming the phasing line lengths and adding some feedpoint capacitance the gain showed a true 8 dB. I didn't be-

# ATCO continued

lieve this at first so I tried several test points around the back yard and got the same result each time. So it is possible to get 8 dBd gain from a dual slot antenna at 439.25 MHz. To date I've not seen any other omni horizontal antenna with gain figures greater than this. If there are I'd like to hear about them!!!

Since I have seen good success with slot antennas, I decided to build another 1280 MHz single slot for the second input to our repeater. I duplicated the design I used for our 1258 MHz repeater transmit antenna I built last year. Testing proved that the 4:1 balun I used before didn't work this time. I decided to determine exactly just what the feed impedance of a single slot antenna at 1280 MHz was. To do this I built ¼ wave coaxial matching sections of various impedances till I found the one with the best match. The best match occurred with a ¼ wave section impedance of about 60 ohms. Therefore the antenna impedance was somewhat less than 75 ohms. I was surprised for all text articles I've read stated impedances of 100 to 200 ohms for antennas like this. Never-the-less I decided to trust my data and feed the antenna directly with 50 ohm coax. It worked fine, however, I found here that a balance to unbalance stub at the feed point helped the final gain by about 1 dB. After cleaning it up and adding some feedpoint capacitance tabs, the gain was about 4 dB. This is a little lower than I had hoped for but I was tired of playing with it. Case closed. Art...WA8RMC




# ATV TALK AT HUNTINGTON, W.VA. HAMFEST

This summer I attended the Huntington, West Virginia hamfest for the first time and was very favorably impressed. (Huntington is just across the Ohio River from Chesapeake, Ohio). It was a very hot day so I was relieved to find it held in downtown Huntington in the civic center building where their hockey team plays. They covered the rink with wooden flooring over the ice so it was at times almost too cool in there even though it was pushing the mid 90's outside.

The hamfest itself was somewhat small but I counted at least 6 vendors to complement the individuals that were selling their "stuff". The ATV group was well represented also with Ron WA4GSS demonstrating his repeater. Additionally, their ATV group had a table full of ATV goodies. Ron held an ATV seminar which I attended and found to be very well done.

The seminar also included a video presentation of their past balloon launches followed by a question and answer session about this fascinating portion of our hobby. Included was a hands on look at the actual electronics package that made the last trip. Although it looked quite primitive all wrapped up in its styrofoam housing, I was impressed on how they were able to pack so much functionality into such a light weight package. For those of us that have never seen a device like that, the pictures below should prove to be fascinating. Who knows, maybe some of us could get hooked!!!

# ROCHESTER ATV

Sub: Rochester ATV, kites, and the other list
Date: 94-08-02 08:19:08 EDT
From: atv@irony.com
To: ATVQ

Kevin, WB2EMS, asked about ATV in Rochester, NY.

Yes, there has been a crossband repeater in the area, on and off, for almost two years. It was first located south of town high in the Bristol Hills area, but the site didn't work well for a variety of reasons. It was moved near Brockport on the west side of the city. WB2PMM/ATV: 434-in, 910-out, vertical on both.

I can't remember the names or calls, but ATV seems to have moved here from Buffalo. The Buffalo gang appears fairly active. A couple of years ago, the repeater was located in Batavia to link the ATVers west of Rochester in with those active in Buffalo and Toronto. The repeater was struck by lightning and the site was lost before it was repaired. I think the west side OT's and some new folks are working the new repeater now, but I haven't seen it since the move from Bristol. (I live on the east side of Rochester and can't see it.)

I have often heard Roy, WB2PMM, talking to the Buffalo gang on 144.340 while working the simplex, but have never had it good enough to work anyone but Roy directly. Now I understand that they use 144.400 for simplex coordination.

Roy used to transmit space video whenever anyone asked for it and the audo on 144.360, but he was off the air on last mission.

I'm wondering if there is some activity we can tie into up Rochster way, and I've heard about a rumored repeater over in the Syracuse direction. More info greatly appreciated.

It seems like a long stretch, but certainly if we can get together during an enhancement. I, too, have heard rumors of a Syracuse repeater in the works, as well as ATV in Cortland, NY and Kingston, Ontario. Never seen any of it.

On kites: From Mike Blackwell <mkb@cs.cmu.edu>

Antennas. I'm thinking of a base station near the flyer. Since a stunt kite can fly almost +/- 90 degrees into the wind, the receiver needs a pretty omnidirectional antenna. Probably a crossed dipole would do just fine. For the kite, a more directional antenna makes sense. It'll probably be easiest to mount a horizontal dipole, perpendicular to the line. Maybe add a director or reflector along the line.

From fkf1@cornell.edu (F. Kevin Feeney)

You could probably do it with a vertical dipole in the kite and another on the ground tilted to face the kite at the same angle. The advantage to vertical is as the kite moves left and right, the antennas don't null. With the horizontal dipole on the ground, when the kite swings 90 degrees either side, it's in the dipole's null. I don't think adding directors and stuff would buy you much, especially since you can be moving 180 degrees from pointing. (Well, maybe in the kite since you would always be aimed toward the string holder/receiver.)

I've never done this so I am drawing on my vast inexperience...the first thing I would try would be a stiff wire as a 1/4 wave for transmitting. If you need antenna gain, try it on the receiver first. I have a Diamond "Super Gainer" that I take mobile. It's basically a mag-mount version of the dual-band X50, but it is available with the 70 section cut for 434 MHz. If that doesn't work, maybe you can get a second body to track the kite with yagi!

# RABBIT QUESTIONS

Sub: Gemini Rabbit
Date: 94-08-03 15:12:33 EDT
From: atv@irony.com
To: ATVQ

I've seen indirect references to people using Gemini Rabbit transmitters and receivers, presumably modified for different frequencies and more power. Any references or tips on how to go about this? Schematics? They're so cheap, we bought several sets - useful for quick and dirty demos on the robots.Mike

Sub: Gemini Rabbit

I'm not sure you have to retune them, I think they are a part 15 device in a band where we are secondary users. I believe they put only a couple of mw to the antenna; however, I have seen references to adding a modular power amp (I think made by Toshiba) to get them up to a couple of watts. I suspect the amp is a wideband brick made for the cellular industry, and it's a linear amp capable of being driven by only a few mw. (multi-stage device apparently).

Real antennas help a lot too, and it doesn't take much hardware to get gain on 900 MHz. But tolerances are tighter.

That's the little I think I know on the subject. I'd be curious as to other people's experiences on 900 MHz ATV, especially with low budget solutions. I'd like to jazz up more activity locally and cheap would help. 73, de Kevin, WB2EMS

Sub: Rabbits, repeater polarization, video PA;s and ID-ing
Date: 94-08-05 08:38:53 EDT
From: atv@irony.com
To: ATVQ

Kevin Feeney asks:

Do you tune the rabbit receiver? Also, where is the antenna pointed (or is it omni?) on the repeater?

Both the wireless video extenders I've used, the Gemini Rabbit and Radio Shack Think were already right on the proper meg ATV frequencies. No tuning required.

I do think I remember seeing some UHF ones quite some time ago in surplus mags that operated on channels 14-16 or so. Those would have to be returned to legally operated ATV.

Both input and output on WB2PMM/R are vertical. Video is unlikely for awhile. I think the bias is whacked on my amp and it's only delivering about a third power. When it's up to snuff, I get about a kilowatt ERP at the front of the antenna.

What kind of amp? I have a Mirage D1010N modified with the caps for video and with 1.5 watts in, I get about 30 PEP out, 14 dbd gain at the antenna give me in the range of 600-700 watts ERP RHCP, maybe 300 to a linear antenna.

I've got the D100ATV, ordered it with the repeater heatsink cause I like long keydowns. (I started out with a much smaller RF Concepts 4-32 that I warped by running it too long.) For an antenna, I use the Rutland (model-mumble) ATV.

On ID'ing...Where is the boundary? Still can't find the book. It seemed to me it talked of ID'ing signals and emissions and didn't really talk about ID'ing transmitters. From that, I thought a separate audio transmitter on the audio subcarrier would count as the same signal.

See this issue's W6ORGy Notes for info on the Rabbit!

# A BASIC STATION
# by Henry Ruh KB9FO

The question that is asked most is what do I need to get on ATV? For those already on, skip to the next paragraph. For those who are beginning, stay tuned:

Getting on ATV is as simple as getting on 2 meter FM or any other mode. Obviously, you need a TV set to see the picture and hear the sound. Any TV set will do. An older set with selectable auto fine tuning is better since the TV set will try and find the strongest signal, which will usually be the adjacent channel broadcast signal. That is, you are trying to find a weak signal to send to your TV set, which is tuned to channel 3 or 4. If there is a local station on the adjacent channel (2 or 4 for three, or 3 or 5 for 4) the TV sets AFT will try to lock onto the broadcast signal. This makes finding the weak ham signal difficult. Also, the "auto find" electronic tuners will interfere since they will "hunt" for a signal even when there is no signal present and skip over weak signals when the AFT pulls it to a strong broadcast signal. The older "turret" tuner or a mechanically adjusted electronic tuner (you move a knob and watch a color strip move on the screen or a pointer move across a scale of the channel) work best.

If the TV has a turret tuner (mechanical 13 position knob that "clicks" from station to station) tune in channel 3 or 4, which ever is not used in your area, (four is the better choice if you have channels 2 and 5) and adjust the find tune knob for minimum pickup of the broadcast signals. Likewise, if you have the continuous tune electronic tuner (color strip or pointer) adjust the TV between 3 and 4 to obtain the least amount of local broadcast TV signals. In some cases you may see some UHF TV stations appear when you tune your ATV downconverter. Typically channels 19, 20. These are images (your tuner + their frequency rather than your tuner - the frequency). A bandpass filter ahead of the ATV receiver will cure this.

The output of your downconverter will be the 420-450 MHz band, converted to the channel 3-4 frequencies (60-72 MHz). The TV set tuner becomes a new IF (second conversion) for the UHF ham signals. As you adjust the ATV receiver dial, you are tuning the converter across the band and watch the output on channel 3-4 of the TV set. Do not adjust the TV set further at this point.

When you receive a ham TV signal, say on 439.25 MHz, you can adjust the fine tune on the TV set and the ATV receiver slowly and together to "peak" the signal into the passband of the TV receiver. You may find two dial positions which provide reception, one slightly above the other on the ATV receiver. Use the higher of the tw. You are receiving the upper and lower sideband signals of the ATV signal, but the TV set only received the upper sideband signal as a complete TV signal. The TV set is internally filtered to ignore the lower sideband of the TV signal, which is usually present in ham TV signals because we usually do not employ vestigial sideband filtering which removes most of the lower sideband in broadcast TV.

If there is interference from FM mode users on the ham TV signal, you can tune to the lower side (this is the same as variable passband filtering on an HF rig) to eliminate or reduce the interference since the FM signals are usually above 440 MHz and the lower video sidebands are below 439 MHz.

You should have an antenna! Oh yeah! A good beam is best. There are several available which offer 14 dB or more gain. If you are serious about ATV, you should target 20 dB antenna gain (four 14 dB+antennas=20dB). If the a TV activity in your area includes 421, 426 or 434 MHz, you should get an antenna which is made for ATV or 432 MHz operation, NOT one made for 440 MHz FM (often made for 445 MHz). The reason is: the FM mode beams lose a lot of gain and the pattern often degrades severely 20 MHz below their design frequency.

The 20 element collinear (also know as a broadside or bedspring array) grew in popularity in the early days (and remains in folklore today) over the 11 element Yagi designs partly because, even though both were about the same gain at their design frequency (432 vs 445 MHz), the Yagi had about 25% of its rated gain at 432 MHz and thus was a "narrow" antenna. The collinear design was much flatter in gain versus frequency, and thus performed better. Modern antenna designs have improved the gain/bandwidth of Yagi's and many good Yagi's are made for 432 MHz and lower operation. Still a few are made for only the FM portion of the band.

Your coax must be low loss. Various RG type cables will work poorly and your range will be severely limited by coax that has 30-6 dB loss. At a very minimum 9913 type coax should be used and if you have deep pockets or good luck at hamfests, get some semi-rigid (Heliax) cable, 1/2" or 7/8" minimum. Be sure to use type N connectors! Avoid adapters at all costs. A handful of adapters can have more loss than 100 feet of coax. Why spend good money for low loss coax and lose the dB's you gained because you don't have the right connectors?

Everyone seems to be perplexed about video/audio sources. I haven't figures that out yet. Any video source can be used. Any TV camera ever made and sold in the USA, color or black and white, with or without a tape recorder will work. Any VCR with audio/video out can be used. Any computer with a composite video output (NOT the VGA output) will work. Any other video source you have, will work. For NASA Select feeds of the space shuttle, the audio/video output of your satellite TV receiver is just fine. You can get fancy with switches to select sources, special effects boxes, and other video items but these are not necessary. They just add to the fun. Even video "still" cameras work! Your old Robot scan converter video output works!

The video source is connected to the video input of the transmitter. Turn the knob about 3/4 of the way UP or until someone says the picture just got to white, and you are on the air.

For audio, any cheap mic (Radio Shack audio cassette recorder mics work fine) will serve as the "low impedance" mic source. Low impedance generally means it is a dynamic mic (vs a crystal or ceramic mic) and has an impedance of 600 ohms or less. The exact value is not important. You can use a high impedance mic (Astatic D-104 is an example) by using a low cost transformer to convert it from high impedance (hi-Z) to a low impedance (low-Z) source. Most TV transmitters have a small jack next to the audio jack for "push to look." This is spaced so that if you use a common audio cassette recorder mic which has a "pause" switch, the switch part is used as the transmit/receive switch. The second prong (plug) carries the switch and the larger plug carries the audio.

# A BASIC STATION

In nearly all cases, audio is usually sent via 2 meter FM. The most common frequency is 144.34 MHz which is used as an intercom and CQ frequency. Some areas use other frequencies. A list has been published in ATVQ and ATV Secrets books regularly.

To find another ATV station, the common practice is to put our video CQ on the air, while also calling CQ on the 2 meter frequency. Typically, "This is KB9FO calling CQ for video on 439.25." When another station replies, you each point your ATV antennas at each other and begin your QSO. If you are in an area with a repeater, you transmit on the TV repeater input and watch on the repeater output. All users point their antennas at the repeater.

To ID your video, you can use any means you desire. You can voice ID on the audio of the TV transmitter, or hold up your video ID (QSL cards and call letter license plates are often used) which can be anything with your call letters on it. Many users use computer graphics to make billboards or animated call ID's, and also to pass on station information.

Remember, the other station only sees what you send. You have to point the camera at what you want the other person to see. Also remember to have the light on! A dark room with a single bulb is not very visible. Invest in a couple of flood lights, or good general lighting (4 foot florescent work well). If need be, mount a couple of reflector type work lights (the clamp on type which sell for about $1.99) on top of the camera so the lights follow where the lens points. Just as in any photography, lights make the picture! No light, no picture!

If you have more than one source, say two cameras and a computer, you can add a selector switch to go directly from one to another without changing cables. Despite the 5 MHz range of the video signal, just about any switch will work, even cheap toggle switches. Connect all the shields together and switch only the center conductors. A rotary switch can also be used. For ham purposes, it is not necessary to invest big bucks in video switchers unless you want the advantage of added effects or switch audio and video. Audio and video can be switches with a DPDT toggle switch as easily as video or audio alone on a SPDT switch. A mini box with connectors for in and out can be made with a few drilled holes and connectors. The cast metal boxes are a little nicer since the weight helps keep them in place. Velcro strips can hold it where you want it as well.

## *THREE BEST ACCESSORIES*

I am often asked, what should I spend my money on after I get a basic station on the air. It depends. If you are getting good range, i.e., using a good antenna and a 50-100 watt amplifier, and terrain or location prevent DX (i.e., you are in Wyoming or western Kansas) adding a pre-amp would only make the received pictures better. Just about anywhere else, the pre-amp is first choice since it will add significant range to any station. Especially during band openings which happen a lot. Most people don't see the band openings because their stations are not equipped to see them!

After the pre-amp, an off air monitor, not just another TV set but an actual line sampler, is nice since you can see directly what your ATV signal looks like when you transmit. This lets you set video gain and sync levels for a good transmitted signal. If the other station doesn't get a good picture and it looks good on your monitor, its THEIR problem, not yours. The line sampler takes a tiny amount of your RF signal, converts it to baseband video which you can watch on a monitor, and even better, on a scope. The scope lets you adjust the sync stretcher, black and video level controls for a proper signal that the TV receiver will respond to best. Poor sync level is probably the number one cause of poor reception of a ham TV signal. Do not go by just what the TV set shows you (or the receiving stations comments). You can only make a good judgement using a scope to look at the actual sync to video ratio. For more info refer to the section on scopes and video signals in TV Secrets Volume II. I doubt that 10% of ATV hams have ever scoped their signals or monitor them on a regular basis. Without it you are transmitting in the dark (literally). Good sync level is essential to getting a good locked up picture at the other end. Virtually every report of a jittery signal or poor lock up can be blamed on improper sync levels. No sync, no picture! Part of your own monitoring should be a picture you can see when you are transmitting so you can frame the picture, keep it in focus, and show what you want the other person to see.

The third item is good lights! You don't have to spend a lot to get good light, but a few minutes with a light meter and a few reflector lamps or floodlights will do wonders for your live shack video. It also reduces the focus problems. Amateur video people invariable do not use enough light. The result is constant fiddling with the focus of the camera as it is moved from item to item. The more light, the better the depth of field of the camera (and the more pleasing the picture looks) and then you don't have to constantly focus the camera. The typical dark shack QSO goes, "wait a minute while I focus the camera (jiggle, giggle, zoom, zoom, giggle, giggle) there, is it in focus yet?" Check your monitor and you can tell if it is in focus!

Sending home videos or movies? Use the TV transmitter to transmit the natural sound (sound from the video or movie) and use the 2 meter frequency for narration. This will add to the enjoyment of the viewer. OK now get out there and have some fun. 73 Henry

*Here are some of the notes that pass across my computer screen from America ONline.*

# ATVQ on America online

Sub: OK! Amateur Television
Date: 94-07-26 01:38:35 EDT
From: atv@irony.com
To: ATVQ

On Monday, 25 Jul 94, 20:21:33 - 0400, Steve Mann steve@media.mit.edu> said:

I just got my 10 watt Down East Microwave amplifier, and tried it out last night.

Ahh...I've been thinking of ordering the same one (I think). Which model did you get? From what I can tell, the 3310PA (10mW in-> 10W out) will do the trick ($150). Others say the PF0011 module will work too (same gain at 903 MHz), but it's just a module and needs a heat sink.

Oh, I figure we should get some company contact info onto the list for those that are shopping (like me), so here's what I have:

Down East Microwave, RR1, Box 2310, Troy, Maine 04987, 207-948-3741.

This seems like a nice place, with quite a selection of specialy microwave gear. Their loop yagi antennas look pretty nice. Anyone else try one?

Also, this company is particularly in tune with ATV needs:
PC Electronics, 2522 Paxson Lane, Arcadia, CA 91007-8537, 818-447-4565.

They make downconverters, transmitters, and transceivers of all kinds. They don't (yet) have much 900 MHz gear though.

I used a Recoton to drive the input of the amplifier (which takes 10mW in; I presume the Recoton produces 10mW, though I'd like to buy a wattmeter to see if that is the case.

Well! I've been carrying on an E-mail conversation with a few folks of the last weeks on using a Wal-Mart VCR extender as a 900 MHz transmitter. Some background:

Wal-Mart markets these under the Popular Mechanics label. It's in the electronics department for $29.95, and the output frequency is tunable through the whole 900 MHz ham range by a pot inside.

I don't know what the output power is, but estimates put it somewhere around 2 mW, possibly as high as 4. I haven't found the power tweak know yet.

Does anyone still sell the Recotron units?

I used the Down East Microwave antenna that is about 3 feet long, and put it on my desk pointing out the door (I am in one of those newer cement and steel buildings). I could pick up my signal out in the hall, but I lost it halfway down the hall. Without the amplifier, I get about 25 feet or so, and with the amplifier, I get maybe 50 feet of range. There were two closed glass and metal doors between me and where I put the receiver.

Hmm...the signal is supposedly very directional, especially with a yagi antenna, so if it wasn't pointed at you, that might explain it. I am hoping to be able to hit the Mt. Palomar ATV repeater with 10 watts, and that's about 75 miles away from me, so I would hope you can get more range than that.

Also, I was wondering where I might get a cheap frequency counter and wattmeter to check the output of my amplifier for power and frequency.

I hear it's hard to measure either the frequency or the power since the video signal is over 6 MHz wide. I have an Optoelectronics Model 3300 frequency counter which I am happy with. The frequency doesn't track very well on the TV signal, but it gives me a ballpark idea. The video content seems to throw it.

As for power, I have no idea. How do people measure these things? The fastest scope I can find samples at 1 GHz, so that doesn't even come close to seeing the signal.

The other problem I have is trying to determine which of my connectors (e.g., double female bnc, and the like) are 50 ohm and which ar 75 ohm).

I don't think the connectors themselves have any (real) impedance of their own. The cable and equipment at the end are what determine your microwave. People have recommended the "N" connector or anotehr micro-sized UHF connector that I've never seen. I'm using BNC and it seems to be working fine. Just make sure your contacts are clean and snug.

An ethernet cable seems to work ok for the antenna (I believe these are the correct 50 ohm impedance, and I believe that standard "video" cables are the wrong - 75 ohm that is - impedance). Maybe for a short run it doesn't much matter?

The shorter the run, the better. My understanding is that the thin coax isn't too good for microwave. It attenuates pretty hard when you get up to 1 GHz. I'm using Belden 9913, which is absolutely beastly to work with, but only loses about 5 dB per 100' of cable. If your cable is really short, any 50 ohm should do it.

The other problem I had was that when I was close to the transmitting antenna (e.g., when I walked past it) the picture jumped around alot on the screen of the TV connected to my Recoton receiver.

Hmm...sounds like it got overloaded. Since I don't have an amp yet, I've never seen this problem. Steve Haehnichen steve@vigra.com

• • • • • • • • • • • • • •

Rrom: atv@irony.com
To: ATVQ

The 3310PA (10mW in-> 10W out) actually uses the PF0011 bolted to a nice big heatsink. The 3310PA is a well-made package, obviously hand built as it has file marks, and a rough look with holes that appear to have been drilled and tapped by hand (probably not something they sell millions of every day).

Does anyone still sell the Recotron units? I didn't realize they were old, though your questions seem to imply this. I saw them for the first time quite recently, and, yes, they are still on sale at Leechmere, for around $100 (I forget the exact price), in a large box with a picture of a dog on the cover. They have 2 audio inputs marked "L and R" but these go to the same input.

There is a channel change switch for "A" and "B" which just selects from two pots (no crystals I could see).

Recoton also makes a wireless speaker that uses a package that looks very much the same.

The antenna is a sophisticated looking printed circuit with four arms spiraling out from the center. I don't know if it is 50 ohm, 75 ohm, or some other.

Hmm...the signal is supposedly very directional, especially with a yagi antenna, so if it wasn't pointed at you, that might explain it. I got their shortest (most non-directional) yagi which has a beamwidth of 40 degrees, 3db according to their spec sheet.

I am hoping to be able to hit the Mt. Palomar ATV repeater with 10 watts, and that's about 75 miles from me, so I would hope you can. That would be quite nice, but I am setting a more modest goal, like 500 feet or so (more than 75 feet), but I'd like to run simplex indoors, around corners, non-line-of-sight. I chose 900 MHz because I thought it would have a better chance of fitting down hallways and the like, in the various cement and steel buildings at MIT.

The shorter the run, the better. My understanding is that I will try a double female connector and put the amplifier right on the antenna. That way the run will be less than 2 inches. I probably just got a bad match or something, somewhere.

Any ideas as to whether or not a bad match could damage the PF0011? I was just going to experiment with different cables and connectors and see what happens.

Also, how are you going to hit that repeater without an accurate frequency

measurement? Are there repeates on the East coast I should look out for (e.g. so I don't accidentally hit one, since I am trying to run simplex at the moment)?

I also have a 10 GHz gunplexer, and I've read W4UCH's cookbook on the subject of gunplexers. That might be a good way to hit a repeater up on a mountain with only 10 milliwatts. He's done a few miles with only 10 milliwatts. Around here there are all sorts of buildings and I expect...correct me if I am wrong...anyone who might know...that 900 MHz will do better than 10 GHz in an urban environment...33 cm seems small enough to go through windows but large enough to rattle around between buildings? For some reason, gunplexers don't appear to go around corners very well.

• • • • • • • • • • • • • • • • • •

Sub: OK! Amateur Television
Date: 94-07-25 21:00:22 EDT
From: atv@irony.com
To: ATVQ

Sounds interesting. I just got my 10 watt Down East Microwave amplifier, and tried it out last night. I used a Recoton to drive the input of the amplifier (which takes 10mW in; I presume the Recoton produces 10mW, though I'd like to buy a wattmeter to see if that is the case.

For station ID, I just pointed my camera at a handwritten callsign, though perhaps someone can tell me if there is any legibility requirement, or the like (e.g. I could buy one of those character generators, or use a camera like Ed's that has a frame store).

I used the Down East Microwave antenna that is about 3 feet long, and put it on my desk pointing out the door (I am in one of those newer cement and steel buildings). I could pick up my signal out in the hall, but I lost it halfway down the hall. Without the amplifier I get about 25 feet or so, and with the amplifier, I get maybe 50 feet of range. There were two closed glass and metal doors between me and where I put the receiver.

I kept the antenna in its cardboard carton, connected an RG58U (50 ohm) BNC cable to it and taped it back up, so I can carry it around and try it in various places. The next thing I wantd to try was to see if I can get the signal down the "Infinite Corridor" at MIT (the 3rd longest corridor in the world).

Is there anyone near MIT who would be interested in testing ATV in the 902-928 MHz band?

Also, I was wondering where I might get a cheap frequency counter and wattmeter to check the output of my amplifier for power and frequency.

The other problem I have is trying to determine which of my connectors (e.g. double female BNC, and the like) are 50 ohm and which are 75 ohm. There appears to be no markings. Does it matter much if I use the wrong (e.g. 75 ohm) kind? An ethernet cable seems to work ok for the antenna (I beleive these are the correct 50 ohm impedance, and I believe that standard "video" cables are the wrong - 75 ohm that is - impedance. Maybe for a short run it doesn't much matter?

The other problem I had was that when I was close to the transmitting antenna (e.g. when I walked past it) the picture jumped around a lot on the screen of the TV connected to my Recoton receiver.

• • • • • • • • • • • • • • • • • • •

Sub: OK! Amateur Television
Date: 94-07-25 19:59:13 EDT
From: atv@irony.com
To: ATVQ

When a subdues friend of mine, Bill, KB2KJT, first saw my TV transmission he said "It's ok, not great, it's ok." I picked up on that and changed the station call to N2NVD.

I made a big N2NVD on a postscript printer so it was as wide as the "ok" line, taped it to the wall and locked it into my camcorder's memory. The camcorder has a remote control so when I am live but sitting comfortably in the station's cushy chair, I can just push a button to ID.

I like to think of my ATV as a free picture phone. (OK, not even close to free. My cheapest investment in amateur radio was the five and a quarter I spent on my license.) My pet peeve is people that just send me their call. Boring...I want to see something! In retaliation, I send the "flaming" N2NVD (now AA2MZ). With that big call in the cam's memory, I aim it at the station monitor, zoom in so that the image is just a little larger than the call and the video feedback makes it seem like it's on fire.

One November during the rating sweeps, I had 11 viewers. Though not all at once. Only one of them had transmitters. Right now I'd say my primary interest in amateur television is getting more people interested in amateur television.

My call-badge says "ed - AA2MZ - OK! Amateur TV. I'm not the only one that misspells "amateur".

I am currently on 70 and 33cm in various states of disrepair. I have a pair of GE/Ericson cellular base stations that are 1 milliwatt in, 50 watts out. I ran a Rabbit™ into one and got about 28 watts of blanking power to the business end. I am amazed that the Rabbit receivers can stay locked onto those things...before I give up on using the Rabbit transmitter as an exciter, does anyone have a clue if they can be converted to crystal control?

I hope to get a crossband repeater up here in town (Irondequoit, NY) real soon now. I still need many parts. Had a friend chomp a little off a cellular interdigital filter (Hamfest, ten tucks) and I tuned it with a spectrum analyzer to use as a 910 MHz VSB.

So, anyway, to advertise the list, it is customary to include some "fine" words as a description of its purpose. Any ideas?

73, Ed (Subtly trying to get a conversation going" Taychert.

• • • • • • • • • • • • • • • • • • • • •

Sub: Rochester ATV, FAQ, more on audio and ID-ing
Date: 94-08-04 17:50:17 EDT
From: atv@irony.com
To: ATVQ

I've tried everything I can think of...my favorite is the Radio Shack "satellite dish" preamp feeding my Rabbit™. I think it's as sensitive as my PC-DC and only a bit more noisy. (Of course the PC downconverter with a preamp is really nice.)

Do you tune the rabbit receiver? Also, where is the antenna pointed (or is it omni) on the repeater?

I hate it when I can't get into a sytem. I think there's a tree between me and .97 machine...:-) A ham I know that's a 100 feet lower than me works it with a small beam. I can't and I have a pretty good look in all directions. I'll try to coordinate a (voice) contact with you privately.

I don't think a tree would be that much of a problem—especially on 2 meters, but I have seen problems on 440, and seen path changes on 2 meters to some extent with winter/summer change in foliage.

Video is unlikely for awhile. I think the bias is whacked on my amp and it's only delivering about a third power. When it's up to snuff, I get about a kilowatt ERP at the front of the antenna.

What kind of amp? I have a Mirage D1010N modified with the caps for video and with 1.5 watts in I get about 30 PEP out, 14 dbd gain at the antenna give me in the range of 600-700 watts ERP RHCP, maybe 300 to a linear antenna.

We just got a mailing list and now you want a FAQ too? Not me, any volunteers?

Not sure what should be in one, but I might be interested in collaberating on one with someone. Don't have the time to lead the effort.

I believe that you can ID the TV transmitter with video, audio or CW.

• • • • • • • • • • • • • • • • • • • • •

Sub: Is there an ATV newsgroup?
Date: 94-08-03 00:55:40 EDT
From: atv@irony.com
To: ATVQ

Adrian Godwin, G7HWN, UK. This is John Langner, WB2OSZ.
I have a question: Can anyone suggest where I might find an economical PAL signal generator? (PAL, not NTSC!) I found a little junky looking one in a catalogue for $400. There was a design published recently in the BATC news (British ATV club magazine) for, I think, an EPROM-based testcard generator. Adrian

*More next issue! Stay tuned! 73 Henry*

**WHEEL ANTENNAS!**

**70 cm Little Wheel**
420-450 Mhz: ATV or 432.1 SSB

**900 Mhz Nano Wheel**
ATV

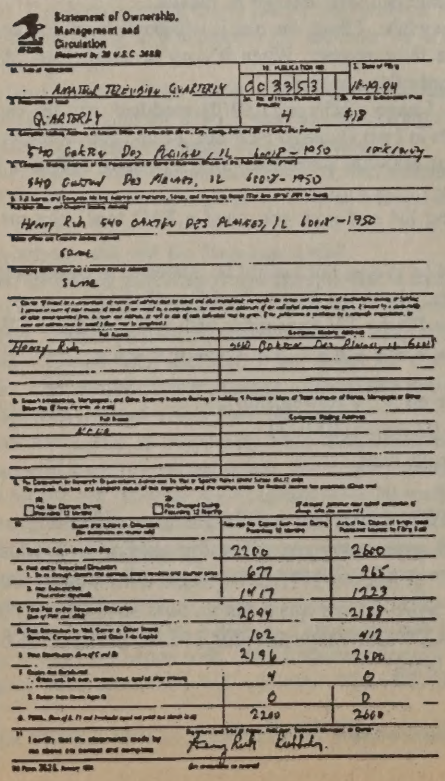
**23 cm Mini Wheel**
ATV

**13 cm Micro Wheel**
Horizontally Polarized Beacons
***All Stackable!***

**$39.95 ea.**
any band

**Mag Wheels:** Magnetically-Mounted Versions Of The Above Antennas: **$59.95**

Olde Antenna Lab
4725 W. Quincy · Denver, CO · 80236
(303) 798-5926

Statement of Ownership, Management and Circulation

AMATEUR TELEVISION QUARTERLY — 10 PUBLICATION NO. 0 0 2 3 5 3 — 11. Date of Filing VP-M-94

QUARTERLY — 4 — $18

540 CARTER DES PLAINES, IL 60018-1950 — 10 ISSUE(S)

540 CARTER DES PLAINES, IL 60018-1950

HENRY RICH 540 CARTER DES PLAINES, IL 60018-1950

SAME

SAME

Henry Rich — 540 CARTER DES PLAINES, IL 60018

NONE

| | | |
|---|---|---|
| A. Total No. Copies (Net Press Run) | 2200 | 2600 |
| B. Paid and/or Requested Circulation: 1. Sales through dealers and carriers, street vendors and counter sales | 677 | 965 |
| 2. Paid Subscriptions (Mail Subscriptions) | 1417 | 1223 |
| C. Total Paid and/or Requested Circulation (Sum of 15B and 15B) | 2094 | 2188 |
| D. Free Distribution by Mail, Carrier or Other Means (Samples, Complimentary, and Other Free Copies) | 102 | 412 |
| E. Total Distribution (Sum of 15C and 15D) | 2196 | 2600 |
| F. Copies not Distributed: 1. Office use, left over, unaccounted, spoiled after printing | 4 | 0 |
| 2. Return from News Agents | 0 | 0 |
| G. TOTAL (Sum of E, F1 and 2 - should equal net press run shown in A) | 2200 | 2600 |

I certify that the statements made by me above are correct and complete. — Henry Rich Publisher

Submitted by Andy G8PTH

# WORDS OF WARNING

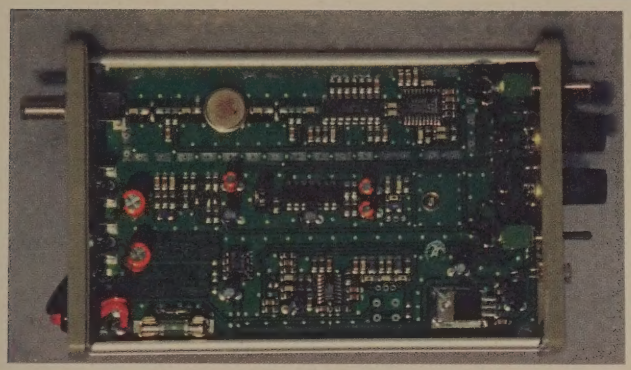
Visitors beware! Manufacturers have developed a special hoodwinking language to proclaim the many virtues of their products, as ordinary, honest technical performance language does not seem to do justice to the many wondrous things they try and sell you. To alert IBC delegates to what has been dubbed "punter-speak", we issue this guide to essential knowledge that can save all end users much stress and anguish.

NEW Different color from previous design.
ALL NEW - Parts not interchangeable with previous design.
PROTOTYPE - A tentative idea customers must seduce us into realizing.
EXCLUSIVE - Imported product
UNMATCHED - Almost as good as competitor's or needs burning.
DESIGN SIMPLICITY - Manufacturer's costs cut to the bone
FOOLPROOF OPERATION - No provision for adjustment
ADVANCED DESIGN - The Ad agency doesn't understand it.
IT'S HERE AT LAST - Surprise, surprise...customs did let it through.
FIELD-TESTED - Manufacturer lacks test engineers/equipment.
HIGH ACCURACY - A unit on which all parts fit.
DIRECT SALES ONLY - Factory had a big fight with distributor network.
YEARS OF DEVELOPMENT - Thanks to the SGI on the front, we finally got one to work.
UNPRECEDENTED PERFORMANCE - Nothing we ever made before worked like this.
REVOLUTIONARY - It's different to the competitors.
BREAKTHROUGH - We finally figured out is has an application
FUTURISTIC - No other reason why it looks the way it does.
DISTINCTIVE - Different shape, different color, buttons anywhere but usual.
MAINTENANCE FEE - Impossible to repair
REDESIGNED - Previous faults corrected, we hope.
HAND-CRAFTED - Assembly machines operated without gloves on.
PERFORMANCE PROVED - Should operate through the warranty period.
MEETS ALL STANDARDS - Ours, not yours.
SATISFACTION GUARANTEED - Manufacturer's, upon cashing your check.
MICROPROCESSOR CONTROLLED - Does things WE can't explain.
ALL SOLID STATE - Heavy as hell.
BROADCAST QUALITY - Gives a picture and makes noise.
HIGH RELIABILITY - We made it work long enough to ship it.
BUILT TO PRECISION TOLERANCES - Finally got it all to fit together.
SMPTE BUS COMPATIBLE - When done, will be shipped by Greyhound.
MILITARY SPEC COMPONENTS - Made from military surplus parts.
24-HOUR CUSTOMER SERVICE - Given 24 hours, we can find someone to ignore you.
CUSTOMER SERVICE NATIONWIDE - you can return it via most airports.
HIGH ACCURACY SURFACE TOLERANCES - feels smooth
FIRST TIME IN EUROPE - Launched in Vegas because visitors to NAB don't ask too many smart-arse questions.

HF Technology Inc.

HIGH FREQUENCY TECHNOLOGY INC.
457 SANTA FE TRAIL
CARY, ILLINOIS 60013
(708) 639-4336

# THE *NEW* IF70



## *IF70 FM Video Audio IF/Demodulator Specifications:*

| | |
|---|---|
| **IF Input Frequency:** | 70 MHz nominal |
| **IF Bandwidth:** | 16 MHz |
| **IF Sensitivity (3 dBQ):** | less than -85 dBm |
| **IF Sensitivity (20 dBQ):** | less than -72 dBm |
| ***Overall Sensitivity (3 dBQ):** | less than -95 dBm (P1 picture) |
| ***Overall Sensitivity (20 dBQ):** | less than -90 dBm |
| ***Overall Sensitivity (40 dBQ):** | less than -80 dBm (P5 picture) |
| **IF Input Dynamic Range:** | -97 to +5 dBm |
| **Video Bandwidth:** | 10 Hz to 4.0 MHz CCIR de-emphasis |
| **Video Output:** | 1 Vp-p into 75 Ω @ 4 MHz peak dev. |
| **Differential Gain Variation:** | less than 2 % p-p |
| **Differential Phase Variation:** | less than 1.5° p-p |
| **Subcarrier Detection Range:** | 5.5 to 6.2 MHz (4.5MHz opt.) |
| **Audio Bandwidth:** | 10 Hz to 15 KHz +/- 3 dB<br>75μs de-emphasis |
| **Audio Output:** | Line Level greater than 8 Ω |
| **Power Supply:** | 11 to 15 VDC @ 300 mA |
| **Operating Temperature:** | 0° to 40°C |
| **Case Dimensions:** | Length: 6.5" Width: 4.2" Height: 1.5" |
| **Enclosure:** | Composite aluminum extrusion with steel cover painted light gray. |

*** Measurements with RX930, RX1300, or RX2500 downconverter**

**Rear Panel Inputs:**

IF - "F" connector 75 Ω

**Rear Panel Output:**

Video - RCA (phono) connector composite video signal 1.0 V p-p, 75 Ω output impedance.

Audio - RCA (phono) connector standard line level audio, load impedance > 8Ω

**Front Panel Controls:**

On/Off switch, Audio output level, Subcarrier Tune, Video polarity switch, Power indicator.

**Internal Controls:**

Video output level

**FM IF/Detector Features:**

- SAW Filter with Flat Group Delay for Excellent Sensitivity and Selectivity
- Phase Locked Loop Baseband Demodulator for Stable Tuning
- ***NEW!*** Front Panel Adjustable Frequency PLL Sound Sub-carrier Demodulator
- Front Panel Volume Control and Video Invert Switch
- Linear Phase IF/Baseband Filtering for Unexcelled Video Fidelity

---

***COMMERCIAL QUALITY AMATEUR TELEVISION for the 33cm, 23cm, and 13cm Bands!***

| | | |
|---|---|---|
| **TX930** | 33cm 3 Chan. Synthesized FM Television Transmitter w/Sound Sub-carrier | **$369** |
| **RX930** | 33cm FM/AM Television Downconverter w/70MHz or TV Channel 3-4 IF Output | **$219** |
| **TX1300** | 23cm 3 Chan. Synthesized FM Television Transmitter w/Sound Sub-carrier | **$369** |
| **RX1300** | 23cm FM/AM Television Downconverter w/70MHz or TV Channel 3-4 IF Output | **$219** |
| **TX2500** | 13cm 3 Chan. Synthesized FM Television Transmitter w/Sound Sub-carrier | **$499** |
| **RX2500** | 13cm FM/AM Television Downconverter w/70MHz or TV Channel 3-4 IF Output | **$259** |
| **IF70** | 70MHz IF Strip and FM Video Detector w/Sound Sub-carrier Detector | **$219** |

**VISA** and **MasterCard** accepted. Call or write for additional information or complete specifications. All prices do not include shipping and handling and are subject to change without notice. Illinois residents add 7% sales tax.

***Engineered and Manufactured Entirely in the U.S.A.***

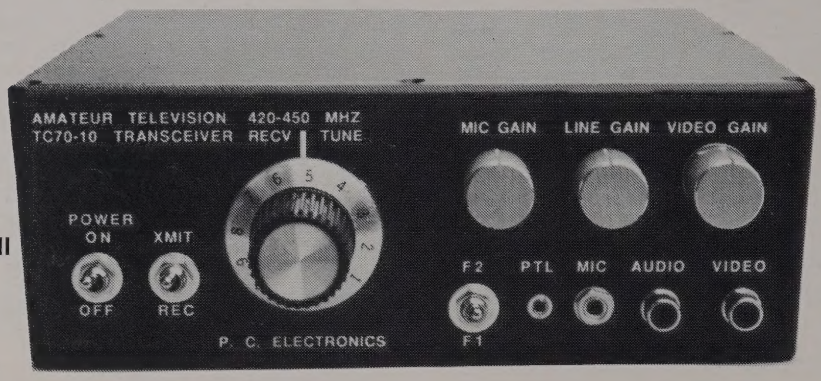
P.C. ELECTRONICS 2522 PAXSON LANE ARCADIA CA 91007-8537 USA
TOM (W6ORG) & MARYANN (WB6YSS) O'HARA (818) 447-4565
24 hr **FAX** order line (818) 447-0489

ELECTRONICS

# TC70-10 ATV TRANSCEIVER

**All in one box**

VALUE PLUS
QUALITY
FROM OVER
25 YEARS
IN ATV




RUGGED

RELIABLE

Shipped within
24 Hrs. of your call

**ONLY**
**$499**
**delivered UPS**

**≥10 Watts**
**p.e.p. Out**

**Made in USA**

## TC70-10 Transceiver lets you get on right away with all the power most will need in one box - *90 Miles line of sight

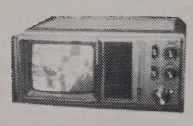
- Adjustable peak envelope power RF output
  Typical range from 2 to ≥10 Watts allows proper adjustment to fully drive the RF Concepts 4-110 or Mirage D1010-ATVN to full 100 Watts p.e.p., without sync or audio clipping.
- Separate mic and line audio volume controls
  Lets you do voice over commenting on video tapes
- Rugged 7.5x7.5x2.7" black die cast alum. box
  Stands up under rough public service applications and takes up less space on the operating table than 1 Watt plus amp.
- True Final RF detected video monitor output
  lets you properly set the video gain control based on final output RF rather than low level. Camera video is at this jack during receive for focus & lighting set up before transmitting.

Front panel jacks accept composite video and line audio from your camcorder or VCR plus a low Z mic with push to look. Sensitive GaAsfet downconverter tunes whole 420-450 MHz 70cm band down to your TV channel 2, 3 or 4. Comes with one crystal you specify on 439.25, 434.0, 427.25 or 426.25. Second switch selectable crystal add $15. Requires 13.8 Vdc @ 3 Amps.

P.C. Electronic pioneered the ATV transceiver in 1977 with the 10 Watt TC-1. While the change in 1985 to the 1.5 Watt units gives the flexibility of selecting 15, 50 or 70 Watts depending on the situation, many long time ATVers said they missed the old 10 Watter which did just fine in most cases for local and repeater use - *90 miles snow free line of sight using 14 dBd beams. You've always been able to build your own 10 Watt system from some of the basic modules on page 2 (TVC-2G, TXA5-70, FMA5-F and PA5), but now we have a ready to go alternative in a rugged die cast aluminum box.

Transmitting equipment sold only to licensed Tech class radio amateurs, verified in the Callbook, for legal purposes. If newly licensed or upgraded, mail or fax copy of license. However, receiving downconverters available to all (pgs 4 and 5).

## COMPLETE 70CM ATV STATION

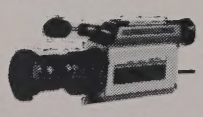


Your TV set

+

+

+



Your video camera
or camcorder

+

**TC70-10...$499**
**ATV Transceiver**
**10 Watts p.e.p. min.**
13,8 Vdc @ 3A power supply req.
specify transmit frequency(s)

Optional 100 Watt Amplifiers
RF Concepts 4-110.....$359
Mirage D1010-ATVN ...$359
25 Amp pwr supply req.

Antennas - see pg 5
KLM 440-16X 14dBd $139
KLM 440-10X 11 dBd $77
KLM 440-6X 8.9 dBd $60
RUTLAND FO22-ATV 15.8 dBd $119

Remember when comparing prices, ours include UPS surface shipping. **10/94**

**2509+ Mile DX set with our gear, KH6HME to WB6NOA & KC6CCC - - - Can you beat it?**
**HAMS, call (818) 447-4565 now for your complete 10 page catalogue of our ATV products!**